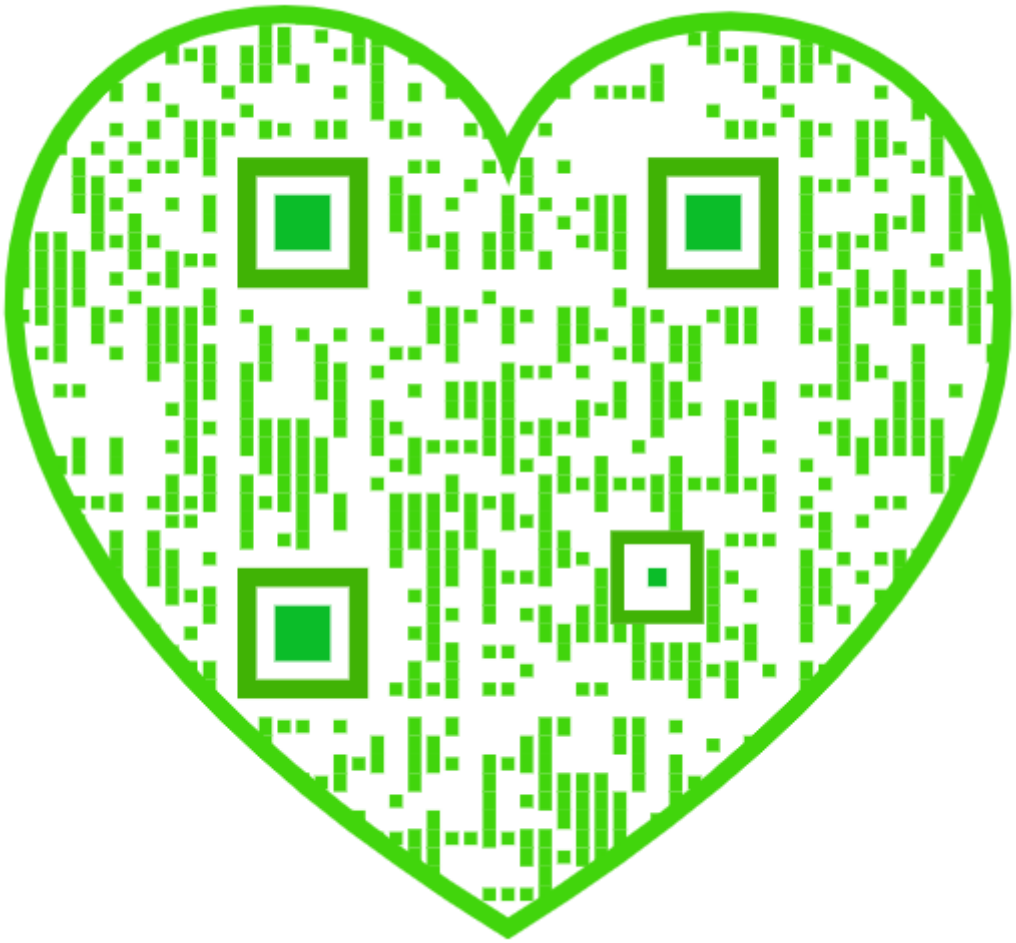

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J. RUSSELL MANNING, M. D., V. S.

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LIVE-STOCK ENCYCLOPÆDIA,

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——: WITH ALL THE :——

FACTS CONCERNING THE VARIOUS BREEDS AND THEIR CHARACTERISTICS, BREAKING, TRAINING, SHELTERING, BUYING, SELLING, PROFITABLE USE, AND GENERAL CARE;

——: EMBRACING :——

ALL THE DISEASES TO WHICH THEY ARE SUBJECT—THE CAUSES, HOW TO KNOW, AND WHAT TO DO; GIVEN IN PLAIN, SIMPLE LANGUAGE, FREE FROM TECHNICALITIES, BUT SCIENTIFICALLY CORRECT AND WITH DIRECTIONS THAT ARE EASILY UNDERSTOOD, EASILY APPLIED, AND REMEDIES THAT ARE WITHIN THE REACH OF THE PEOPLE;

——: GIVING :——

THE MOST RECENT, APPROVED AND HUMANE METHODS FOR THE PRESERVATION AND CARE OF STOCK, THE PREVENTION OF DISEASE, AND RESTORATION OF HEALTH;

DESIGNED FOR THE FARMER AND STOCK-OWNER.

——: BY :——

J. RUSSELL MANNING, M. D., V. S.

WITH 400 ILLUSTRATIONS.

ST. LOUIS, MO.:
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PUBLISHER'S PREFACE.

It is with especial pleasure and pride that the publishers present to the public this volume. They believe that in design, extent, variety of matter and illustration, especial adaptability to the wants of the farmer and stock owner, and in its explicit and practical teachings, it has not been equalled in the history of American agricultural publications. No author has to the same extent carried into effect in this department of literature the modern and popular idea of "*object teaching.*" And in no department of literature is such teaching so useful and practical in character. With our author it has not been enough to describe; but he illustrates—teaching through the eye as well as by word, and with a definiteness in both respects that will enable any one, by proper study, however unfamiliar with the subjects of which it treats, to become well versed in all the essentials of a practical knowledge of the use, care, diseases and treatment of domestic animals. Though the book is large, the system of the arrangement is so perfect that any fact in its contents can be readily found, and this constitutes it a most convenient work for ready reference as well as for general study. The illustrations, covering the subjects of breeds, characteristics, points, character, and the various stages of diseases, etc., are exhaustive, while the elaborate charts, so minutely illustrating the ages of the horse and cow, are decided features and most useful as well as novel.

The author's careful education in the profession of Veterinary Medicine, his large practice, and his experience in the general care and management of live stock, have eminently qualified him for the task he has undertaken, and we place the result of his labor before the public, believing that he has done his work well—that he has produced a book that will be of most practical and pecuniary value to every stock-owner. Believing this, the book is launched upon the sea of agricultural literature with the confident belief that it is demanded and that it will accomplish its mission of usefulness.

AUTHOR'S PREFACE

The author's object in writing the following book was to impart such practical information to the American farmer and stock-owner, as will lead to a much needed and beneficial reform in the breeding, care and general treatment of domestic animals; to offer such information in practical shape as will enable him to realize a greater benefit from live stock in health, and familiarize him with the causes that produce diseases, that he may avoid them; and also to give such facts that he may know the nature of a disorder when it exists, as well as the proper remedies to apply.

In the suggestions offered we have kept steadily in view the necessity of simplicity in describing disease, and of prescribing those remedies that the ordinary farmer can without difficulty procure and easily administer. In a practice of twenty-five years in country districts, among the agricultural classes, we believe we have learned to know their wants in this respect, and this volume is an earnest effort to meet them. It has always been a matter of surprise that such a work for farmers and small stock-owners—simple in style and diction, yet scientifically exact, covering the entire subject of domestic animals—has never been prepared; yet we believe we speak within the facts in saying that our agricultural literature has to the present time been without a volume fulfilling these requisites.

The effort has been to produce a systematic work, accessible to the farmer, giving the known facts and principles of the art of handling, improving, breeding, care and management of domestic animals in health, the causes which produce disease, and how to avoid them; how to know disease, and what to do. In short, to produce such a work as will serve as a valuable hand-book, both for study and for constant reference for the farmer, and which will enable him to turn the industry of stock-breeding, raising, buying and selling to greater *profit*.

In what we have said concerning the characteristics, excellences and defects of the various breeds of live stock (and in this we have tried to be full, explicit and exact), we have not been biased by partiality for any, and have studiously avoided expressing any preference, when the facts, obtained by long familiarity with the subjects, and much reading and observation, did not clearly sustain the position taken.

The book is not in any sense in the interest of any breed or breeds, and even less is it in the interest of any class of breeders or importers. In these things the interests of *truth* and the *reader* have been the influences that controlled. There is no advertisement in its pages.

If in the directions given throughout the work we have subjected ourselves to the charge of making a hobby of careful and tender treatment of animals, we reply that a long experience, and the observations of a life-time, have very strongly impressed us that not only humanity but *economy* is best served by kindness, and if the influence of this book shall lead to a more general study of the comfort of domestic animals, we will feel that we have served the *financial* interest of the breeder in an equal proportion to the welfare of the animals.

One of the facts that has always forcibly impressed us is, that among horse owners, and even those long familiar with horses, there are so few good judges of a horse. The different developments of the horse for the different purposes for which horses are used, seem to be little understood, yet it is susceptible of very accurate knowledge, and in the appropriate places in these pages, we have, by careful analysis of the *points* of the horse, and very copious illustrations, given facts that will enable any one to readily determine a horse's appropriate uses and his value. In this is included the very extensive chart for telling the age, and also the easy directions for ascertaining vices and unsoundness.

With the other domestic animals like information is given and with equal plainness. With these facts before him, so explicitly stated and so exhaustively illustrated, any one can soon learn to buy to advantage. We have endeavored to guard the unsuspecting against the arts of the jockey, and to point out so plainly the difference between an elegant and common horse, a good and bad one, a sound and unsound one, an old and a young one, a vicious, dangerous horse, and a kind, tractable one, that any person may easily learn to protect himself against imposition. The same plan has been sustained with the other subjects.

Hard names and technical terms have been avoided as much as possible, but when terms of anatomical and medical science have been necessarily employed they are explained and applied with a degree of plainness and precision that brings them within the ready comprehension of every reader.

To aid the non-professional owner in deciding the nature of disease, engravings are given which show the positions in the different stages of various diseases, and which cannot fail to be of great value in determining the character of the disorder.

This preface ought not to be concluded without acknowledging the able assistance rendered in the preparation of this book by Hon. Jonathan Periam, of Chicago, whose great experience with stock, and as an agricultural writer, extending through a quarter of a century, has been of such advantage in its preparation. To his extensive information, practical suggestions, and ready pen, every department of the work is indebted, and acknowledgments are hereby made.

To Prof. Ed. Porter Thompson of Bentonville, Arkansas, a graceful and prolific writer, and a scholar of classical attainments, obligation is also expressed.

J. R. M

TABLE OF CONTENTS.

PART I.

THE HORSE, HIS HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

CHAPTER I.

HIS HISTORY AS A COMPANION AND SERVANT OF MAN.

PAGE.

Connected with Man from a Very Early Age.—His Importance as a Helper in the Work of the World.—His Superiority Over the Other Animals.—The Horse and His Rider become in Some Measure one Creature.—His Nativity: Doubt Concerning it.—His Existence upon Earth Probably Contemporaneous with that of Man.—The Most Ancient Authors Allude to Him.—He Passes into Different Parts of the Globe.—Wild Herds in the Eastern Continent.—Origin of the Wild Herds in America.—Found as a Domestic among Nearly all People.—Greater Liability to Disease in a Domestic than in a Wild State.—Subject to Deterioration under Ignorant Management.—The Wisdom of the Arabs as Breeders and Keepers.—Difference of Opinion among Men as to Systems of Breeding; Attention Called to its Treatment in this Work.—Knowledge and Skill necessary to His Proper Care..... 17

CHAPTER II.

ILLUSTRATED DESCRIPTION.

Necessity for a Comprehensive Idea of the Construction of the Horse, and the Relations of His Parts.—Scientific Terms Used, but Explained.—Subsequent Portions of the Work More Readily Understood by Reference to this Chapter.—Knowledge of Structure Indispensable to Surgery.—Skeleton; Sectional View of Thorax, Abdomen, and Pelvis; Vertical Section of Head; Section of Foot; Front and Back View of Foot; and External Parts..... 22

CHAPTER III.

HOW TO TELL A HORSE'S AGE.

A Knowledge of Changes in the Teeth the Only Means.—This Chapter to be Studied in Connection with the Chart which Follows.—Buyers Likely, without this Knowledge, to be Deceived.—Incisors Chiefly to be Relied on.—Condition of a Foal's Mouth.—The Changes that Follow.—How Foal Teeth are to be Distinguished from Horse Teeth.—Wearing away of the Grinder or Enameled Portion.—Number of Teeth in a Full Grown Animal.—Difference between Horses and Mares as to Number.—Incisors, Hooks, and "Wolf's Teeth."—How to Determine Age till Foal is Two Years Old.—How from Two to Old Age.—The Horse of Medium Size to be Taken as a Stand-

PAGE.

ard.—Shooting up and Grinding off.—Irregular Teeth; How to Judge.—Peculiar Hardness of Bones and Slowness of Change in Certain Breeds.—The Mule; Age Hard to Find Out with Exactness.—Deceptions; How to Detect.—Crib Biters How to Examine.—Terms defined..... 31

CHAPTER IV.

DIFFERENT BREEDS AND THEIR CHARACTERISTICS.

I. The Inferior Varieties: Many found in Both Hemispheres. Some Good, but Little Known of Them.—II. Some considered as to Work rather than Breed; the Farm Horse; the Hunter; the Hackney; Horses for Heavy Draft.—III. The Arabian.—IV. The Barb.—V. The English Thoroughbred.—VI. The Persian.—VII. The Turk.—VIII. The Turkoman.—IX. The Egyptian.—X. The Doogola.—XI. The Norman Percheron.—XII. The Thoroughbred in America.—XIII. The Morgan.—XtV. The Narragansett Pacer.—XV. The Canadian.—XVI. The Conestoga.—XVII. Ponies 37

CHAPTER V.

BREEDING AND RAISING.

I. Importance of the Subject.—II. The Best Stock the Cheapest.—III. Hereditary Tendencies and Immaturity to be Guarded Against.—IV. Principles of Transmission.—V. The two Methods, "in-and-in" and "cross" Breeding Considered.—VI. Treatment of the Mare after being Served, During Pregnancy, etc.—VII. How to Know whether a Mare is in Foal.—VIII. How to Know Time of Foaling.—IX. Abortion, or Slinking the Foal.—X. How to Raise Colts.—XI. Mules... 70

CHAPTER VI.

HOW TO BREAK AND TRAIN A HORSE.

I. American vs. English Foals.—II. At Weaning Time.—III. The First Lesson.—IV. Training.—V. Training to Work.—VI. Training to Back.—VII. Training to Saddle and Harness.—VIII. To Handle a Horse —IX. How to Handle a Vicious Colt.—X. Saddling and Harnessing.—XI. How to Subdue a Vicious Horse —XII. How to Train to the Saddle.—XIII. Training to Trot in Harness.—XIV. How to Train to trot in Light Harness.—XV. How to Train for the Plow.—XVI. Training to the Wagon.—XVII. How to Train a Racer —XVIII. Training a Stallion..... 87

CHAPTER VII.

HOW TO SHELTER.

I. Comfortable Shelter Economical.—II. Consideration in Constructing Stables.—III. Mangers and Racks.—IV. How to Insure a Good Temperature.—V. Cleaning the Stables.—VI. The Loft.—VII. The Harness Room —VIII. The Out-shed.—IX. Water..... 106

CHAPTER VIII.

HOW TO FEED, WATER AND GROOM.

I. Laying the Foundation.—II. What to Feed.—III. When to Feed.—IV. Watering.—V. Kinds and Quantities of Food to be Given.—VI. How to Prepare the Food.—VII. How to Make Mashes, Gruels and Hay-tea.—VIII The Value of Hay and Straw.—IX. Feeding Grain.—X. Stable Care and Grooming.—XI. The Time to Clean.—XII. Care of the Feet.—XIII. Blanketing, when Necessary.—XIV. Proper Tools for the Stable..... 111

PAGE.

CHAPTER IX.

BENEFITS OF KIND AND CAREFUL TREATMENT.

I. Abusing a Faithful Servant.—II. What are Barbarities —III. A Picture from Life.—IV. The Other Side.—V. A Good Farmer's Surroundings.—VI. Farmer Unthrift's Farm.—VII. His Home.—VIII. The Careful Man's Theory.—IX. Using the Means We Have.—X. An Infallible Rule 121

CHAPTER X.

HOW TO BUY

I. How to Get Correct Information.—II. The Buyer Must Know What He Wants.—III. Proportions of the Horse.—IV. The Cleveland Bay for Profit.—V. How to Buy a Trotting Horse.—VI. One Must know what He Buys for.—VII. The Light Harness Horse.—VIII. Saddle Horses of all Gaits.—IX. The High-Bred Hunting Horse.—X. Racing Horses —XI. What the Racer Should be.—XII. To Avoid Vices and Defects; How to Detect.—XIII. Other Faults and imperfections..... 131

CHAPTER XI.

HOW TO BUY, CONTINUED.

I. Buying Cheap Horses.—II. Color, in Relation to Value.—III. Action.—IV. Fast-walking Horses —V. What a Horse Should Be.—VI. What Constitutes Unsoundness.—VII. Illustration of Form and Symmetry.—VIII. The Body and Limbs.—IX. The Body as Standing Facing You. X. Front View of Fore-quarters.—Showing Different Bad Conformations.—XI. The Hind-quarters.—XII. The View from Behind.—XIII. What Not to Buy —XtV. Buying for Blood.—XV. Summing Up..... 153

PART II.

DISEASES OF THE HORSE. THEIR CAUSES; HOW TO KNOW THEM, AND HOW TO CURE THEM.

CHAPTER I.

I. Introduction.—II. External Manifestation of Disease..... 183

CHAPTER II.

DISEASES OF THE SKIN AND SUB-CUTANEOUS TISSUES.

I. Scratches.—II. Grease.—III Thrush —IV. Swelled Ankles.—V. Swelled Legs.—VI Surfeit. VII. Mange.—VIII. Ring-worm.—IX. Hide-bound.—X. Saddle Galls, or Sitfasts.—XI. Fungous Collar Tumor —XII. Warts.—XIII. Vermin.—XIV. Larva in the Skin.—XV. Tetter —XVI. Rat-tails.—XVII. Mallenders and Sallenders.—XVIII. Poll-evil.—XIX. Fistula..... 187

CHAPTER III.

DISEASES OF THE GLANDS AND NASAL MEMBRANES.

I. Glanders.—II. Farcy.—III. Distemper.—IV. Nasal Gleet.—V. Nasal Polypus..... 223

PAGE.

CHAPTER IV.

DROPSICAL AFFECTIONS.

I. Dropsy of the Heart.—II. Dropsy of the Brain.—III. Dropsy of the Chest.—IV. Dropsy of the Skin of the Chest.—V. Dropsy of the Scrotum.—VI. Dropsy of the Abdomen..... 241

CHAPTER V.

DISEASES OF THE THROAT, CHEST, AND LUNGS.

I Chest Founder.—II. Bronchitis.—III. Pneumonia, or Inflammation of the Lungs.—IV. Consumption.—V. Pleurisy.—VI. Colds.—VII. Enlarged Glands.—VIII Swelled Throat.—IX. Chronic Cough.—X. Malignant Epidemic.—XI. Difficulty of Breathing.—XII. Broken Wind, Bellows, Heaves.—XIII. Influenza.—XIV. Spasmodic Action of the Glottis and Epiglottis.—XV. Croup.—XVI. Bleeding from the Nose.—XVII. Strangles..... 248

CHAPTER VI.

DISEASES OF THE STOMACH AND BOWELS.

I. Sour Stomach.—II. Colic.—III. The Bot.—IV. Inflammation and Rupture of the Colon.—V. Inflammatiou and Bleeding of the Rectum.—VI. Spontaneous Salivation.—VII. Inflammation of the Stomach.—VIII. Soreness and Itching of the Anus.—IX. Chronic Gastritis.—X. Spasm of the Diaphragm.—XI. Rupture of the Stomach.—XII. Gorged Stomach.—XIII. Inflammation of the Peritoneum.—XIV. Strangulation of the Intestines.—XV. Functional Diseases of the Liver.—XVI. Parasites which Affect the Intestines.—XVII. Diarrhœa..... 272

CHAPTER VII.

DISEASES OF THE LIVER, URINARY ORGANS, &c.

I. Jaundice.—II. Enlargement of the Spleen.—III. Inflammation of the Kidneys.—IV. Profuse Staling, or Diabetes.—V. Bloody Urine, or Hæmaturia.—VI. Thick and Albuminous Urine.—VII. White or Lime Urine.—VIII. Gravel, or Stone in the Bladder.—IX. Suppression of the Urine.—X. Inflammation of the Bladder.—XI. Foul Sheath.—XII. Rupture of the Bladder.—XIII. Spasm of the Urethra.—XIV. Inflammation of the Organs of Generation..... 293

CHAPTER VIII.

DISEASES OF THE TEETH AND MOUTH.

I. Teething, or Dentition.—II. Shedding Teeth.—III. Blind Teeth.—IV. Decay of the Teeth.—V. Scurvy.—VI. Stump-sucking, or Crib-biting.—VII. Lampas.—VIII. Inflammation in and Around the Teeth.—IX. Slavering.—X. Inflammation of the Tongue.—XI. Sharp and Projecting Teeth.—XII. Scald Mouth.—XIII. Aptha.—XIV. Inflammation of the Parotid Gland.—XV. Fistula of the Parotid Duct..... 306

CHAPTER IX.

DISEASES OF THE HEART, BLOOD, &c.

I. Thumps.—II. Scrofula.—III. Fever, or General Inflammatiou.—IV. Enlargement of the Heart.—V. Fatty Degeneration of the Heart.—VI. Enlargement of the Arteries.—VII. Inflammation of the Jugular Vein.—VIII. Inflammation of the Absorbents.—IX. Scarlatina..... 316

CHAPTER X.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

I. Apoplexy, or Sleepy Staggers.—II. Hydrophobia, or Rabies.—III. Mad Staggers, or Phrenitis.—IV. Blind Staggers, Megrims, or Vertigo.—V. Abscess within the Brain..... 327

PAGE.

CHAPTER XI.

DISEASES OF THE MUSCLES AND TENDONS.

I. Blood Spavin.—II. Bog Spavin.—III. Curb.—IV. Thorough-pin —V. Tetanus, or Lockjaw.--VI. Cramps.--VII. Rheumatism.--VIII. String-halt 344

CHAPTER XII.

DISEASES OF THE EYE.

I. Natural Weak Eyes.—II. Sore Eyelids.—III. Moon-eyes.—IV. Cataract.—V. Hooks, or Inflammation of the Haw.—VI. Dimness of Vision.—VII. Worms in the Eye.—VIII. Purulent Ophthalmia —IX. Fungoid Tumors in the Substance of the Eye.—X. Impediment in the Lachrymal Duct.—XI. Gutta Serena..... 354

CHAPTER XIII.

DISEASES OF THE BONES.

I. Big Head and Big Jaw.—II. Sweeny of the Shoulder.—III. Sweeny of the Hip.—IV. Bone Spavin.—V. Enlarged Hock.—VI.--Ring-bone.—VII. Stifle.—VIII. Splint.—IX. Sore shins, Inflammation of the Metacarpal Bones.--X. Rotten Bones —XI. Inflammation of the Knee Bone. XII. Caries of the lower jaw..... 363

CHAPTER XIV.

DISEASES OF THE FEET.

I. Ulceration of the Foot (navicular disease).—II. Cracked Hoof.—III. Hoof Rot.—IV. Corns.—V. Contraction of the Hoof (narrow heel).—VI. Injuries of the Frog.—VII. Founder.—VIII. Nail Pricking.—IX. Canker.—X. Sand Crack.—XI. False Quarter —XII. Quittor.—XIII. Toe Crack —XIV. Pumice Foot.—XV. Seedy Toe.—XVI. Ossified Cartilages.—XVII. Side Bones. XVIII. Incised Wounds of the Sole..... 379

CHAPTER XV.

WOUNDS AND INJURIES AND THEIR RESULTS.

I. Strains and Sprains.—II. Overreach.—III. Brushing, or Speedy Cut.—IV. Broken Knees.—V. Capped Elbow.—VI. Frost-bite.—VII. Burns and Scalds.—VIII. Rupture.—IX. Choking.—X. Wounds Penetrating Cavity.—XI. Contused Wounds.—XII. Lacerated Wounds.—XIII. Punctured Wounds.—XIV. Broken Hock.—XV. Dislocations.—XVI. Various Fractnres.—XVII. Various Distortions.—XVIII. Diseases of the Ear..... 396

CHAPTER XVI.

POISONS.

I. Internal Poison.—II. Poisoned Skin 410

CHAPTER XVII.

VETERINARY SURGERY.

I. Castrating.—II. Bleeding.—III. Tracheotomy —IV. Perioste otomy.—V. Neurotomy.—VI. Division of the Tendons, &c , &c., &c 414

CHAPTER XVIII.

MISCELLANEOUS MINOR DISEASES.

I. Melanosis, or Black Pigment Tumors.—II. Epithelial Cancer.—III. Dropsy of the Lungs.—IV. Stings and Bites.—V. Falling off of the Hair.—VI. Acute Irritation of the Skin.—VII. Hardening of the Skin.—VIII. Exotosis of the Lower Jaw.—IX. Swelling, by Pressure of the Bridle.—X. Sore Nose.—XI. Roaring, or High Blowing.—XII. Wind Galls.—XIII. Rupture of the Hamstring..... 418

CHAPTER XIX.

Medicines: What to Keep; How to Obtain; How to Prepare; and How to Give Them..... 428

CHAPTER XX.

Implements: What to Keep; How to Use..... 443

PART III.

Cattle.

THEIR HISTORY, ORIGIN, BREEDS AND CHARACTERISTICS, MANAGEMENT AND CARE.

CHAPTER I.

NATURAL HISTORY OF CATTLE.

Their Origin.—Early Domestication.—The Different Kinds and Their Peculiarities.—Improved Breeds.—I. Devons.—II. Sussex.—III. Short-Horns.—IV. Alderneys.—V. Holsteins.—VI. Polled Cattle.—VII. Kerry Cows.—VIII. The Cherokee or Texas Cattle, Etc., Etc..... 447

CHAPTER II.

BREEDING AND FEEDING.

..... 551

CHAPTER III.

TRAINING AND WORKING.

Training vs. Breaking.—Training the Calf.—Haltering.—Training to Milk.—Feeding at Milking Time.—Viciousness in Cows.—Hooking Cows.—Training Oxen.—Train Stock Young.—Summing up.—Managing a Kicking Cow..... 571

CHAPTER IV.

HOW TO SHELTER.

Necessity of Shelter.—Artificial Protection.—A Framed Stable.—A Cheap Stable.—About Barns.—A Common Sense Barn.—A Square Cross Barn.—Basements for Cattle.—Arranging the Basement.—Adapting Means to the End.—What to Plant..... 583

PAGE.

CHAPTER V.

HOW TO PASTURE, FEED AND WATER.

About Pasturage.—Clovers that do Well —Undesirable Clovers.—Alfalfa.—The True Grasses.—Timothy, or Cat's Tail Grass.—Blue Grass.—Red Top.—Orchard Grass.—Fowl Meadow Grass.—Time for Pasturing.—Watering.—Feeding Stock Cattle.—How to Feed —Feeding Milch Cows . 601

CHAPTER VI.

BENEFITS OF KIND AND CAREFUL TREATMENT.

Feeding for Profit.—As between well and ill Kept Stock.—Heavy Weights.—Profit in Early Maturity.—Make Beef Young.—Baby Beef.—Feeding; Cost in England.—Summer Feeding.—Animal Waste.—Animal Heat.—Advantages of Summer and Winter Feeding..... 608

CHAPTER VII.

HOW TO BUY AND HOW TO SELL.

The Value of Good Care.—Estimating Weight.—Estimating by Measurement.—Buying to Feed —How to Buy Breeders.—Where Good Beef Lies.—Buying Feeding Stock.—Analyzing the Carcass.—Proper Shape of Well-Bred Fattening Stock.—How to Buy.—Buying Milch Cows.—Buying Dairy Milkers.—Milk Mirrors.—The True Value of Milk Mirrors.—Value of Escutcheon Marks.—Milkers in all Breeds.—Heredity.—Digestion.—Respiration.—Symmetry..... 621

CHAPTER VIII.

THE DAIRY.

Rushing into New Industries.—The Importance of Dairying.—Estimated Production of Butter and Cheese.—Conditions Necessary to Dairying.—How to Build.—Sub-earth Ventilation.—Care of Milk.—Temperature.—Various Methods of Raising Cream.—Making Dairy Butter.—Salting Butter.—Washing or Working Butter.—Packing Butter.—Preparing Packages.—Kind of Salt to Use —Cheese Making.—Cheddar Cheese.—Cheshire Cheese.—How to Sell Butter.—Utilizing Waste Products..... 639

PART IV.

Diseases of Cattle.

THEIR CAUSES; HOW TO KNOW THEM; WHAT TO DO.

CHAPTER I.

DISEASES IN GENERAL—RECOGNIZING AND DISTINGUISHING THEM.

Farmers Should Understand Symptoms.—Of Diseases in General.—Use Common Sense.—Graduation of Doses.—Frequency of Administering.—Forms of Doses.—How to Give Medicine —Injections.—Vapors, Spraying and Fumigation.—Anæsthetics.—To Deprive of Sensation —Blistering.—Firing.—Setons.—Rowels.—Sewing up Wounds.—Fomentations.—Operation of Bleeding.—Recognizing and Distinguishing Diseases.—The Pulse.—The Breathing.—The Animal Heat.—The Skin and Hair.—The Posture.—Indications of Pain.—Special Signs in Cattle..... 661

PAGE.

CHAPTER II.

GESTATION, DISEASES AND ACCIDENTS THEREOF.

Plural and Multiple Gestation.—Treatment During Gestation.—Birth.—Prolonged Labor.—Large Presentation.—Unnatural Positions of the Calf.—Flooding.—Presentation of After-birth.—Inversion of the Womb.—Languid Labor.—Irritability and Straining.—Temporary Paralysis.—Abortion.—Isolation..... 676

CHAPTER III.

INFECTIOUS, CONTAGIOUS AND EPIDEMIC DISEASES.

Pneumonia.—History.—Its Malignant Contagiousness.—Definition.—How the Infection enters the System.—How Long is a Diseased Animal Infectious.—How to Know it.—What to do.—Texas Fever.—How to Know it.—Bloody Murrain.—Its Malignant Character.—Preventives.—What to do.—Foot and Mouth Diseases.—Malignant Catarrh..... 685

CHAPTER IV.

MEDICINES AND INSTRUMENTS: WHAT TO KEEP.

I. Dissection.—II. Action of Medicines.—III. Medicines to be Kept, and Doses.—IV. Simple and Valuable Recipes.—V. Forms of Clysters.—VI. Infusions.—VII. Anti-Spasmodics.—VIII. Mucilages.—IX. Washes.—X. Poultices.—XI. Fumigations.—XII. Tincture for Wounds..... 697

PART V.

Sheep.

THEIR HISTORY, BREEDS, CHARACTERISTICS, BREEDING AND MANAGEMENT.

CHAPTER I.

ORIGIN, PRINCIPAL BREEDS AND CHARACTERISTICS.

Cosmopolitan Nature of Sheep.—Long-Wooled Sheep.—I. Leicester.—II. Border Leicester.—III. Cotswold.—Good Qualities of Cotswolds.—Cotswolds in the West.—IV. Lincoln Sheep.—V. New Oxfordshire Sheep.—VI. Middle-Wooled Sheep.—VII. Cheviot Sheep.—VIII. White-Faced Highland Sheep.—IX. Dorset Sheep.—X. Southdowns.—XI. Hampshire Downs.—XII. Shropshire Downs.—XIII. Oxford Downs.—Fine-Wooled Sheep.—XIV. American Merinos.—The Fleece.—The Head.—The Body.—The Most Profitable Sheep—Divisions of Wool..... 715

CHAPTER II.

BREEDING AND MANAGEMENT OF SHEEP.

Watchfulness Necessary.—How to Breed.—Time for Breeding.—Coupling.—Keeping the Record.—The Management of Rams.—Training Rams.—Pasturing Sheep.—Shade in Pastures.—Water.—Dosing Sheep.—Fall Pasturage and Feeding.—Sheep Barns.—Special Winter Food.—Management of Lambs.—Docking Lambs.—Castration.—Weaning.—The Nursery..... 735

PAGE.

PART VI.

Diseases of Sheep.

HOW TO KNOW AND HOW TO CURE.

CHAPTER I.

ANATOMY AND DISEASES OF SHEEP.

The Head.—The Trunk.—The Fore-Leg.—The Hind-Leg.—Importance of the Head to Breeders.—Diseases of the Head and Brain.—The Teeth.—Swelled Head.—Vegetable Poisoning.—Inflammation of the Eye.—Sheep Distemper.—How to Know it.—What to do.—Grubs in the Head.—How to Save the Sheep.—Apoplexy.—Prevention.—Inflammation of the Brain.—Tetanus, or Lock-Jaw.—Palsy.—Rabies.—Hydatids on the Brain.—Parasites of the Body and Skin.—The Scab.—How to Know it.—Diseases of the Generative and Urinary Organs.—Diseases of the Limbs and Hoofs.—Foot Rot.—How to Cure it.—Fouls, and Travel-Sore Feet.—Gravel.—The Biflex Canal. Maggoty Sheep.—Lung Worms.—Intestinal Worms.—Rotten Liver.—Colic 747

PART VII.

Swine.

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

CHAPTER I.

HISTORY AND BREEDS.

Origin of the Hog.—Teeth of the Hog.—Importance of Swine to Man.—I. Improved Breeds of Swine.—English Breeds.—II. The Berkshires.—Establishing the Improved Berkshire.—Standard Characteristics of Berkshires.—III. Neapolitan Hogs.—IV. Essex Breed.—V. Yorkshire Hog.—VI. Suffolks.—VII. Lancashire Hogs.—VIII. Lancashire Middle-Breed.—IX. Large Lancashire.—American Breeds.—X. Poland China.—XI. Chester Whites.—XII. Jersey Reds.—Chesnires.—XIII. Characteristics.—Recapitulation of Breeds..... 765

CHAPTER II.

BREEDING AND MANAGEMENT.

Importance of Swine.—A Back-Woods Hog.—Fixing and Holding the Characteristics.—Selection Always Important.—Breeding Age of Swine.—Care of Breeding Sows.—Weaning.—Management of Swine.—Absolute Cleanliness Necessary.—Summary..... 784

CHAPTER III.

FEEDING AND SHELTER.

Good vs. Bad Food.—Summer Feeding.—Other Summer Foods.—Roots.—The Grains.—Feeding South.—Mast.—Feeding in Confinement.—Hog Barns.—A Cross Barn.—A Simple Pen.—Summary.—Light vs. Heavy Hogs..... 792

PAGE.

PART VIII.

Diseases of Swine.

HOW TO KNOW AND HOW TO CURE THEM.

CHAPTER I.

DISEASES OF SWINE.

Explanation of Cut.—Difficulty of Administering Medicine.—Good Nursing the Essential.—Malignant and Contagious Diseases.—Malignant Epizootic Catarrh —How to Know it.—What to do.—Intestinal "Hog Cholera," — How to Know It. — Causes. — Treatment. — Prevention. — Contagious Pneumo-enteritis — Its Origin. — The Erysipelatous Form. — The Form with Malignant Throat. — What to Do. — Malignant Anthrax, Splenic Fever. — True Charbon. —Inflammatory Diseases.—Quinsy, or Strangles.—Rising of the Lights.—Pneumonia.—Catarrh in the Head.—Diseases of the Skin.—Measles —How to Know it.—The Lard Worm.—What to do. —Trichina Spiralis.—How to Cure —Lice.—Diarrhea —Summary.... 803

PART IX.

Poultry.

HISTORY; BREEDS, THEIR CHARACTERISTICS; BREEDING AND GENERAL MANAGEMENT.

CHAPTER I.

History and Wild Types..... 819

CHAPTER II.

VARIETIES OF BARN-YARD FOWLS.

I. Dorking Fowls.—II. Silver Grey Dorkings.—III Black Dorkings.—IV. Fawn-Colored Dorkings.—V. Bolton Greys.—VI. Dominique Fowls.—VII. Plymouth Rocks.—VIII. The Ostrich Fowls.—IX. Hamburg Fowls —X. Black Hamburgs.—XI. Leghorns.—XII White Leghorns. —XIII. Spanish Fowls.—XIV. French Fowls.—XV. The Houdans.—XVI. La Fleche Fowls — XVII. The Creve Cœurs.—XVIII. Large Asiatic Breeds.—XIX. The Chittagongs.—XX. Buff Cochins.—XXI. Partridge Cochins.—XXII. White Cochins.—XXIII. Brahma Fowls —XXIV. Light Brahmas.—XXV. Frizzled Fowls.—XXVI Silkies.—XXVII. Breda or Guelder Fowls.—XXVIII. Game Fowls —1. Brown-breasted Reds.—2. Earl Derby Game.—3. Duck-winged Game.—4. White Georgian Game.—5. Game Bantams —6. Other Bantams —7. Seabright Bantams.—8. Japanese Bantams..... 827

CHAXTER III

BREEDING.

The Plumage.—Ideal Shape.—Breeding to Type.—Disparity of Sexes.—Mating.—Breeding Grades. 858

CHAPER IV.

MANAGEMENT OF FOWLS.

Going into Business.—Village Yards —The Poultry House —Proper Food for Fowls —Best Breeds For Market —Egg Producers.—How to Fatten —How to kill and dress Fowls.—Packing for Market. 866

PAGE.

CHAPTER V.

THE HOME OF THE TURKEY.

Varieties of the Domestic Turkey.—I. The Common Turkey.—II. English Turkey.—III.—The Honduras Turkey.—IV. Bronzed-Black Turkey.—V. Guinea Fowl —VI. The Peacock..... 871

CHAPTER VI.

DUCKS.

I. Rouen Ducks.—II. Aylesbury Ducks.—III. Call Ducks.—IV. Cayuga Black Ducks.—V. Grey Ducks —VI. Black East India Ducks.—Summary 878

CHAPTER VII.

GEESE.

I. Embden or Bremen Geese.—II. Toulouse Geese.—III. Hong Kong Geese.—IV. White Chinese Geese.—V. African Geese.—VI. Canada Wild Geese.—Management of Geese..... 886

Glossary of Terms Used by Fanciers and Breeders 893

PART X.

DISEASES OF POULTRY AND THEIR REMEDIES.

CHAPTER I.

DISEASES AND REMEDIES.

Anatomy of the Hen.—Apoplexy.—Its Cause.—Roup —To Cure.—Egg Bound —Inflammation of the Egg Passage.—Cholera.—Gapes.—Cause.—How to Cure.—Crop Bound.—Diphtheria, or Croup.—Lice 897

PART I.

THE HORSE;

—:HIS:—

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

THE HORSE.

CHAPTER I.

HIS HISTORY AS A COMPANION AND SERVANT OF MAN.

CONNECTED WITH MAN FROM A VERY EARLY AGE.——HIS IMPORTANCE AS A HELPER IN THE WORK OF THE WORLD.——HIS SUPERIORITY OVER THE OTHER ANIMALS.——THE HORSE AND HIS RIDER BECOME IN SOME MEASURE ONE CREATURE.——HIS NATIVITY: DOUBT CONCERNING IT.——HIS EXISTENCE UPON EARTH PROBABLY CONTEMPORANEOUS WITH THAT OF MAN.——THE MOST ANCIENT AUTHORS ALLUDE TO HIM.——HE PASSES INTO DIFFERENT PARTS OF THE GLOBE.——WILD HERDS IN THE EASTERN CONTINENT.——ORIGIN OF THE WILD HERDS IN AMERICA.——FOUND AS A DOMESTIC AMONG NEARLY ALL PEOPLE.——GREATER LIABILITY TO DISEASE IN A DOMESTIC THAN IN A WILD STATE.——SUBJECT TO DETERIORATION UNDER IGNORANT MANAGEMENT.——THE WISDOM OF THE ARABS AS BREEDERS AND KEEPERS.——DIFFERENCE OF OPINION AMONG MEN AS TO SYSTEMS OF BREEDING: ATTENTION CALLED TO ITS TREATMENT IN THIS WORK.——KNOWLEDGE AND SKILL NECESSARY TO HIS PROPER CARE.

"And God made the beast of the earth after his kind, and cattle after their kind, and everything that creepeth upon the earth after his kind: and God saw that it was good. And God said, Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth."

Although the precise period at which the horse was subjected to the use of man is unknown, it is not unreasonable to conjecture that it was at a time long anterior to his mention in history; and it is probable that since the day when man was made master of all other created things, no animal has been more constantly his companion and friend; and that no other has contributed so much assistance in subduing wild nature and making everything subservient to his will and promotive of his happiness. Other animals, particularly sheep and cattle, have shared with the horse this usefulness to mankind, it is true: and in our present civilized state, when mechanical ingenuity is making such rapid strides in dispensing with

animal labor, it may be, as is sometimes claimed, that the wool-bearing and milk-giving animals—especially considering that these same animals furnish also a large proportion of our flesh food—are to be held as taking the precedence; but as to adaptability, becoming, as it were, a creature of all work; as to comeliness and quickness of motion; as to a certain sympathy with his master that makes him at times so to partake of his spirit and motions as to seem one with him; as to a readiness of submission to drudgery as well as to proud employments, he is without a rival in the world.

It is affirmed by many that the horse is a native of Asia, but of this we really know nothing. Others affirm with equal, or almost equal, plausibility, that he is a native of central Africa. Where all is conjecture, it is needless in a practical work of this character to speculate. Wherever his primal home may have been, it is at least within the bounds of probability that his existence in Asia, in his present state of development, is contemporary with that of man upon earth. Some among the very earliest records of the human race contain allusions to him as a well known animal, in the service of man. The description in the Book of Job, a production admitted to be of the very highest antiquity, is a case in point. He is mentioned here, in glowing terms, as a martial adjunct to his master—and not as a newly-discovered or recently-subdued creature, but as one with which the world was familiar. Sculptured images of horses as beautiful of form almost as the noble Arabian of to-day have been found among the ruins of the cities of the desert. He is mentioned by Moses in connection with the Egyptians; and records older than the writings of Moses point to his having been known and used by that singular people from the dawn of their wonderful civilization.

We find him thus in both Asia and Africa; and during all the historic period he has been present with man as though native to the soil of many districts of both Continents. Whether borne thither by natural result of migratory wandering, in a wild state, or whether by the ever-spreading human family, there is little to guide us in determining. In the more thinly populated districts of Asia, notably in Southern Siberia, great wild herds have been long known to exist.

Though, as we have previously intimated, there must have been a noble breed of horses in Arabia in the days of their most ancient cities, the introduction of the present breed into that country is thought to have been of a comparatively modern date. It seems clear that long subsequent to the beginning of the Christian era there were few horses in Arabia, and those few of no striking excellence, and that the now celebrated Arabians have either sprung from good horses introduced into the

country within the last thousand years, or are the result of judicious breeding and kindly care bestowed upon a native stock.

He was brought as a domestic animal to the New World, by the early adventurers:—and no trace of him, (if we except a kind of cloven-footed species), having been found upon the Continent, we can account for the herds of wild horses, known to have long existed in different parts of North and South America, upon no other supposition than that they are the descendants of certain Andalusian mares and steeds brought over by the Spaniards, and abandoned by them when they could no longer render them service, or left free to escape to the forests on the death of their masters in battle. There is a story current—of doubtful authenticity, however—that all these immense herds, in both North and South America, are sprung from one stallion and two mares that escaped from the expedition of De Soto through Florida, Georgia, and elsewhere. Be this as it may, there are now many great herds—a single one, especially in South America, sometimes numbering many thousands.

As a domestic animal, the horse is found among almost every people on the globe; and his uses vary with the degree of civilization enjoyed by his owners. It may be remarked also that this degree of usefulness is intimately associated with the degree of his deterioration and with the diseases to which he is subject. In a wild state, he is almost free from disorders of every kind,—so much so that unless killed by accident or by deprivation of necessary food and drink, as is sometimes the case, he lives to a great age—dying in the course of nature, it is believed, at from thirty to sixty years. Among the Arabs, where his condition approaches more nearly to a natural state than among any other people, except the Indians, and where his laborious service to his master is limited almost exclusively to carrying a single rider, he displays his greatest perfections as a domestic animal, and enjoys the greatest immunity from disease. Among the leading nations of Europe and their colonies, where he is for the most part made literally "a beast of burden" in the different capacities of animal for the saddle and for every species of draught, and where man practices almost unrestrained not only his active cruelties but many unwitting enormities, he is said by good authority to be constantly deteriorating and becoming more and more subject to diseases and to premature death.

Among the Arabs, too, the best breeds are preserved in their purity; whereas, among more civilized nations all efforts of man to improve the stock, or even to preserve any desired quality, result at last in rendering the subjects of his experiments more liable to fall into various disorders, and, except in rare instances, in ultimate failure as to change for the better.

It may not be irrelevant to state in this connection that the great excellence of the Arabian of the present day, whatever may have been his origin, is due in part to the extraordinary affection felt for him by his master, which manifests itself in the extreme care that is lavished upon him, and to which he is almost as sensitive as a human creature; in part to his freedom from that severe labor by which the horses of other nations are prematurely broken, stiffened, and deprived of spirit; and partly, no doubt, by the steps which are taken, not so much to *improve*, but to *preserve*, a choice breed. While other nations, notably the English, French and American, are engaged in ceaseless endeavors to improve, and, according to some authorities, constantly making lamentable failures—defeating their own ends by the systems of breeding, training, and use, which they adopt—the wild sons of the desert maintain for their horses from age to age the superiority which they were first found to possess.

Men differ in opinion as to the cause of all this, and the mooted questions of crossing and in-and-in breeding find their respective champions, and the discussion is from time to time renewed; but the fact remains that the horses of Arabia excel all others; while another important fact seems to be most generally overlooked, that the Arabs neither cross nor actually breed in-and-in, but, having by some means obtained a noble race they guard equally against admitting admixture of blood and against too close consanguinity.

The subject of breeding, however, will be found to have been more fully discussed under its proper head; and in conclusion it will perhaps be sufficient to urge upon the attention of the intelligent owner and breeder some few facts which have been touched upon in the course of this brief sketch, namely: That among horses in a wild state disease is rarely known, though admixture of blood most probably does take place, and, for aught we know to the contrary, as close in-and-in breeding as the most pronounced advocate of that system could wish. Thus, we find exemption from destructive disorders, but ordinarily no strongly marked characteristics of race constantly prevailing, and but rarely among them what may be termed really fine animals.

Again, that among the horses of the Arabs and the American Indians, disease is almost as rare as among the wild herds. And again, among those nations where the horse is in the highest degree useful, becoming more the slave than the companion of man, he is the subject of a multitude of infirmities scarcely equalled in number by those to which man is himself heir. It has been said that in becoming the companion and the servant of man, he has partaken, in some measure, of both man's spirit and his physical frailties. In battle, he adds to the terrors of the conflict

by his fierceness as well as by his strength and swiftness; in the stables of careless opulence, he becomes the pampered victim of abundance, and falls a prey to diseases that come by irregular exercise and surfeiting; with hard and driving task-masters, in the marts of trade, and subject to the exactions of business, he is soon stiffened, spavined, and generally broken as to both conformation and locomotion; while among the poorer class of tillers of the soil and other toilers, he seems to become spiritless and dull, and subject to diseases that come rather from want of care than from either over-work or actual deprivation of food and drink.

In his best estate, he is the noblest of the lower animals; in his worst, he is still a property of man, and a helper in his work. A knowledge of his ailments, and the possession of that skill necessary to his relief, is therefore essential to every one who owns even the commonest of the species.

CHAPTER II.

ILLUSTRATED DESCRIPTION.

NECESSITY FOR A COMPREHENSIVE IDEA OF THE CONSTRUCTION OF THE HORSE, AND THE RELATIONS OF HIS PARTS.——SCIENTIFIC TERMS USED, BUT EXPLAINED.——SUBSEQUENT PORTIONS OF THE WORK MORE READILY UNDERSTOOD BY REFERENCE TO THIS CHAPTER. ——KNOWLEDGE OF STRUCTURE INDISPENSABLE TO SURGERY.——SKELETON; SECTIONAL VIEW OF THORAX, ABDOMEN, AND PELVIS; VERTICAL SECTION OF HEAD; SECTION OF FOOT; FRONT AND BACK VIEW OF FOOT; AND EXTERNAL PARTS.

In order that the reader may obtain a clear and comprehensive knowledge of the construction of the horse in all his parts and of the proper relations of those parts, it is thought best to introduce here, in one connected view, a description of the frame-work or skeleton, as seen in Fig. 1; of the internal organs and their positions, as seen in Fig. 2; of the head and its contents, Fig. 3; of the peculiar formation of the foot, Figs. 4, 5, and 6, and of the external parts of the animal, Fig. 7.

It will be observed that while we have used the ordinary scientific terms in naming these various parts, we have annexed, wherever necessary, such explanations as will enable the plain reader to get the full meaning intended to be conveyed.

Some attention devoted to the subject here will of course supersede the necessity of constantly recurring and tedious explanations throughout the subsequent part of the work. The clearness and fulness of the illustrations provided leave nothing more, we think, to be desired on that head; and if the reader chance to find, in our directions as to the treatment of any disease, allusions to the structure of certain parts which he has not well in mind, or terms used with which he is not entirely familiar, his difficulties can be speedily removed by reference to this chapter.

Any attempt to perform those surgical operations, however simple, which sometimes become necessary in the treatment of domestic animals, must of course be directed by that knowledge of form, structure, and related functions which we endeavor here to impart.

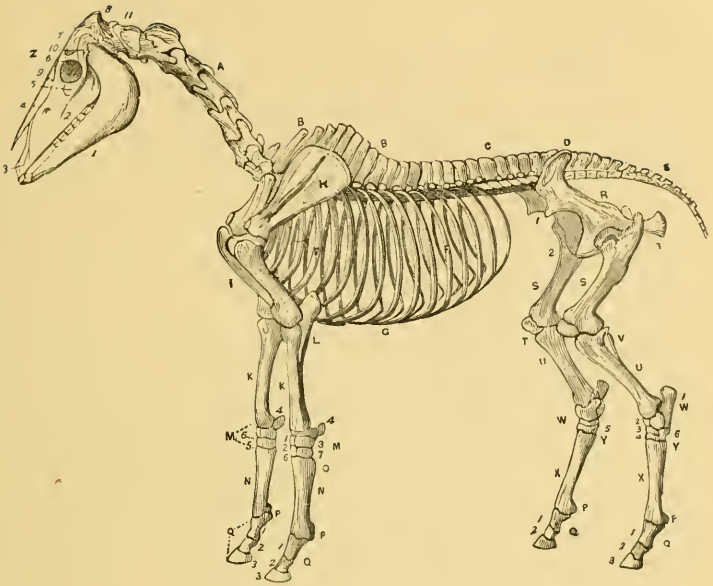

FIG. 1. SKELETON.

Explanations.—**A**—Cervical vertebræ, or seven bones or joints of the neck.

B, B—Dorsal vertebræ, or the eighteen larger joints of the back-bone.

C—Lumbar vertebræ:—the six joints of the back-bone lying between the upper ends of the false ribs, and the upper edge of the haunch bones.

D—Sacrum, or bone which forms the back part of the pelvis.

E—Coccygeal bones, or tail bones.

F, F—Ribs.

G—Costal cartilages, or the cartilages by which the ends of the ribs are joined.

H—The scapula, or shoulder blade.

I—The humerus, or large round bone between the point of the shoulder and the elbow, or upper part of the fore-leg.

K, K—The radiuses, the outer bones of the fore-legs, extending from humerus to knee.

L—The ulna, the larger of the two bones of the upper part of fore-leg, lying behind the radius and extending from the knee to the lower part of chest.

M—The carpus, or knee, composed of: 1, the scaphoid, or bone having a boat-like form; 2, the semi-lunar, or bone resembling a half-moon; 3, the cuneiform, or wedge-shaped bone; 4, the trapezium, or bone resembling the mathematical figure of that name; 5, the trapezoid, or bone resembling a trapezoid; 6, the os magnum, or great bone of the knee; 7, the unciform, or hook-shaped bone; 8, the pisiform, or pea-shaped bone.

N, N—The large metacarpal or cannon, the big bone of the fore-leg reaching from the knee to the ankle.

O—Small metacarpal or "splint bones," the two smaller bones of the lower part of the fore-legs.

P, P—The sessamoid bones—two small bones found in the substance of the tendons at the joining of the fore-leg to the ankle.

Q, Q—Phalanges, embracing: 1, the upper pastern bone; 2, the os corona, or lower pastern bone; 3, the os pedis, or first bone in the leg, inside the hoof—the coffin-bone; and naviculare, a small ship-shaped bone, at the back of the lower pastern, not marked in the figure.

R—The pelvis, or basin, composed of: 1, the ilium, or flank bone; 2, the pubis, or fore-part of one of the bones of the pelvis; 3, the ischium, or hinder and lower part of the hip-bone.

S—The femur, or thigh bone.

T—The patella, or small bone covering the stifle joint—the joint of the hind leg near the flank.

U—The tibia, or large, long bone between the hock and the stifle joint.

V—The fibula, the small, long bone behind and attached to the tibia.

W—The hock, or that joint of the hind leg between the stifle-joint and the fetlock, embracing the following small bones: 1, the os calcis, or back point of the hock; 2, the astragalus, or upper bone of the hock that supports the tibia; 3, the cuneiform magnum, or largest wedge-shaped bone; 4, the cuneiform medium, or middle-sized wedge-shaped bone; 5, the cuneiform parvum, or smallest wedge-shaped bone; 6, that small bone of the hock having a somewhat cubical form.

X—Large metatarsal, the front bone of the hind leg, between the hock and the pastern joint, below which are 1, 2, 3, the phalanges of the hind leg.

Y. The small metatarsal, or small bone of the hind leg in rear of large metatarsal.

Z—The head, embracing: 1, the inferior maxilla, or lower jaw; 2, the superior maxilla, or upper jaw; 3, anterior maxilla, or outer part of

the jaw; 4, the nasal bone, or bone in front of the nostrils; 5, the malar, or prominent cheek-bone; 6, the frontal or forehead bone; 7, parietal, the sides and upper part of the skull bones—(wall bones); 8, occipital, the bone of the hinder part of the head; 9, the lachrymal, or bone inclosing the lachrymal gland and duct; 10, the squamous, or scaly portion of the temporal bones; 11, the petrous, or hard part of the temporal bones inclosing the organs of hearing.

To summarize, the spine is divided into cervical, dorsal, and lumbar vertebræ, or joints, in all, thirty-one; the tail contains about seventeen joints; the dorsal vertebræ, with eighteen ribs attached on each side, and the breast-bone (which is not shown in the figure), form the thorax, or cavity inclosing the heart, lungs, &c.,—thirty-seven bones; the fore part is made up of forty bones, taking both sides together; the pelvis, or basin, of three bones; the remainder of the hinder part, of thirty-eight bones; the cranium of ten; the face and lower jaw of eighteen; of teeth there are forty (in the male); the small bones of the internal ear, taking both, are eight; and the hyoid, or tongue bone, consists of five parts.

It is not the province of this work to enter into minute anatomical descriptions; and for all really practical purposes the foregoing will be found ample.

It must however be borne in mind that a thorough study of the anatomy and frame work of the animal is absolutely necessary to a perfect understanding of how to breed, rear, care for, break and train an animal. At the same time, neither the horse breeder, trainer, or driver, needs to understand them so critically as must the veterinarian. The one requires simply a general knowledge of the several parts, the other must understand intimately and critically each and every part, not only in itself but with reference to its bearing and influence on, and relation to other parts of the body. Thus what we give in illustration, while not going into minutia such as would be necessary to make the veterinary expert, will be fully sufficient for the instruction and every day use of the practical man, whether he be breeder, trainer, or simply the gentleman who drives for pleasure.

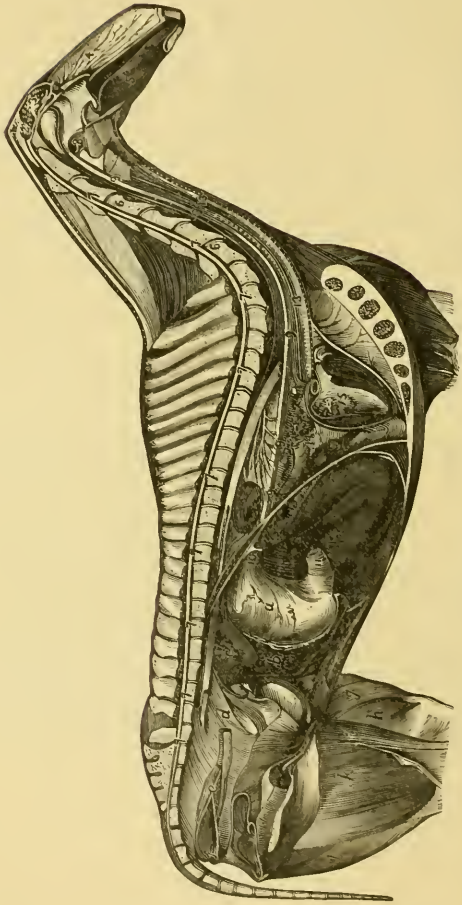

FIG. 2. LONGITUDINAL SECTION OF THORAX, ABDOMEN, PELVIS, ETC., WITH THE INTESTINES AND LIVER REMOVED.

Explanations.—1—The occiput, or that part of the skull which forms the hind part of the head. 2—The cerebellum, or hinder and smaller division of the brain. 3—The cerebrum, or front and larger division of the brain. 4—The nasal membrane, or cartilage between the nostrils. 5—The tongue. 6, 6—Joints of the neck bone, 7, 7, 7, 7—The spinal cord, or marrow. 8—The pharynx, or cavity bounded by the membraneous and muscular walls beneath the base of the skull, into which the nose and mouth both open, and which is continuous below the œsophagus. 9, 9, 9—The œsophagus, or passage through which food and drink go into the stomach. 10—The orifice of the stomach passing through the diaphragm. 11—The pylorus, or the orifice of the stomach through which the food passes into the intestines. 12, 12—The hinder surface of the diaphragm, or membrane which separates the stomach and bowels from the heart and lungs. 13, 13—The trachea, or windpipe. 14—The lungs. 15—The heart. a—The stomach. b—The spleen, or milt. c—The left kidney. d—The broad ligament of the uterus or womb, with the left portion, and the ovary or that part which contains the seed displayed. e—The rectum, or terminal portion of the large intestines. f—The anus. g, h, i, j, k, l—Internal muscles of the thigh.

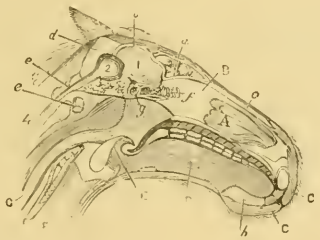

FIG. 3. VERTICAL SECTION OF HORSE'S HEAD.

This cut illustrates still more fully the structure of the head and its contents. a---The frontal bone, showing sinus or channel beneath. b---The parietal or wall bone, covering the brain. c---The nose bone. d---The occipital or back head bone. e, e---The Atlas, or first bone of the neck, showing the spinal marrow in its center. f--The ethmoid or sieve--like bone, through which the olfactory or nerve of smelling passes. g---The sphenoid or wedge-like bone, which, with the ethmoid, supports the base of the brain. h---Part of the lower maxillary or jaw bones, with the lower incisor teeth. 1---The cerebrum, or large brain. 2.---The cerebellum, or small brain. 3---The medulla oblongata, or upper portion of

the spinal marrow. 4—The spinal marrow. A—The turbinated bones, or thin, bony plates, in the form of a scroll or horn, found in the nostrils, and serving to give wider distribution to the lining membrane of the nose. B—The septum nasi, or cartilaginous division between the two nostrils. C, C—The lips. D. The tongue. E—The epiglottis, or valve of the larynx. F—The trachea, or windpipe. G—The œsophagus or gullet.

It will be observed that the great object in the formation of the cranium, that of furnishing a firm cover and a sure protector of the brain against all ordinary accidents, is secured by the employment of nine bones, arranged in this manner: The two frontal bones (a), make up the anterior or forward part; the parietals (b), comprise the upper and central parts, and cover the outer lobes of the cerebrum; the occipital bone (d), a single bone of great solidity, is at the back of the head; a little lower, and back of the occipital bone, is the aperture through which the spinal cord, together with some nerves and an artery, make their exit from the brain. Here the bone is smooth and rounded for the purpose of jointing with the atlas, the first bone of the neck. The sphenoid bone (g), forms the inferior and central part of the cranium. The ethmoid (f), through which the olfactory nerve passes, together with the sphenoid, as noted above, assists in upholding the base of the brain. In proximity to the facial bones are found sinuses bearing names derived from their nearness to particular bones.

The temporal bones forming the sides of the cranium are composed of two parts, the squamous, or scaly, and the petrous, or stone-like. The petrous portion of the temporal bone contains the organs of hearing, having upon its inside surface the openings for the passage of the auditory nerve; and upon its outside, large passages for the conveyance of sound.

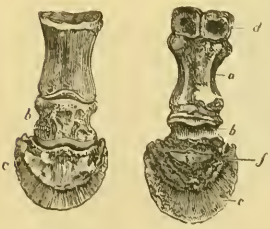

FIG. 4. FRONT AND BACK VIEW OF THE BONES OF THE FOOT.

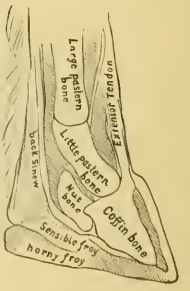

FIG. 5. SECTIONAL VIEW OF THE BONES OF THE FOOT.

Figs. 4 and 5, taken in connection, will serve to give the reader still more definite knowledge than that conveyed by the skeleton of the relative situation of the different parts of the horse's foot, and the terms applied to each. The bones exhibited in the front and back view, Fig. 4, are: c, c —The coffin bone, or first bone of the leg. d—The sessamoid bone. b, b —The small pastern. a, a—The large pastern.

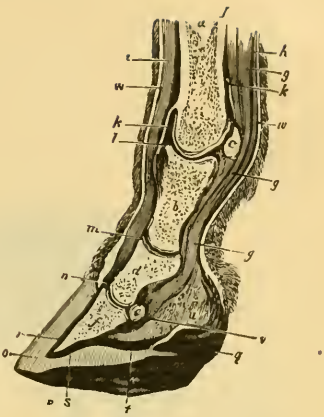

Fig. 6. Vertical Section of the Foot and Lower Leg.

The parts exhibited by Fig. 6 are: a—The large metacarpal or cannon bone. b—The os suffraginis, or large pastern bone. c—One of the sessamoid bones. d—The os coronæ, or small pastern bone. e—The navicular bone. f—The os pedis, or coffin bone. g, g, g—The flexor perforans, or penetrating tendon. h, h—The flexor perforatus, or penetrated tendon. i—The extensor tendon. j—The suspensory ligament. k, k—The capsular ligament, or membraneous elastic bag surrounding the joint. l—The fetlock joint. m—The pastern joint. n—The coffin joint. o—The horny crust. p, p—The horny sole. q—The frog. r.—The sensible laminæ. t—The sensible frog. u—The cushion. v—The navicular joint.

It will be observed that the parts exhibited by Fig. 5 are plainly named on the engraving.

The next cut furnishes a beautiful and comprehensive view of the terms applied to the various parts of the animal, and it can but prove of great use to those who would not only "talk horse" themselves, but understand the talk of others—especially of veterinary writers when treating of disorders, their location, and the proper means for their relief.

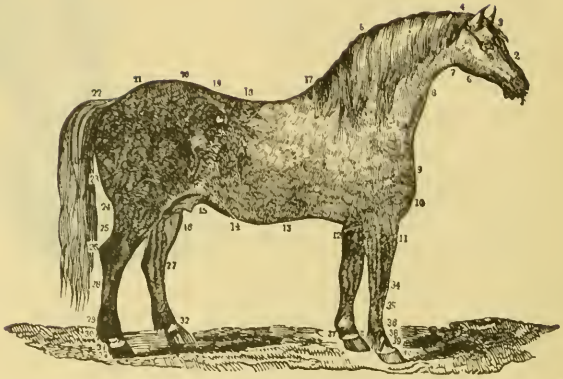

FIG. 7. EXTERNAL PARTS OF THE HORSE.

Explanation.—1. The muzzle. 2—The face. 3—The forehead. 4—The poll. 5—The crest. 6—The jowl. 7—The gullet. 8—The windpipe. 9—Point of the shoulder. 10—The breast. 11.—The arm. 12—The elbow. 13—The girth. 14—The flank. 15—The sheath. 16—The stifle. 17—The withers. 18—The back. 19—The loins. 20—The hip. 21—The croup. 22—The dock. 23—The quarter. 24—The thigh or gaskin. 25—The hamstring. 26—The point of hock. 27—The hock, (hough) 28—The cannon bone of hind leg. 29—The fetlock. 30—The large pastern. 31—The small pastern. 32—The coronet. 33—The hoof. 34—The knee. 35—The cannon of fore leg. 36—The fetlock. 37—The heel. 38—The large pastern. 39—The small pastern. 40—The hoof.

CHAPTER III.

HOW TO TELL A HORSE'S AGE.

A KNOWLEDGE OF CHANGES IN THE TEETH THE ONLY MEANS.——THIS CHAPTER TO BE STUDIED IN CONNECTION WITH THE CHART WHICH FOLLOWS.——BUYERS LIKELY, WITHOUT THIS KNOWLEDGE, TO BE DECEIVED.——INCISORS CHIEFLY TO BE RELIED ON.——CONDITION OF A FOAL'S MOUTH.——THE CHANGES THAT FOLLOW.——HOW FOAL TEETH ARE TO BE DISTINGUISHED FROM HORSE TEETH.——WEARING AWAY OF THE GRINDER OR ENAMELLED PORTION.——NUMBER OF TEETH IN A FULL-GROWN ANIMAL.——DIFFERENCE BETWEEN HORSES AND MARES AS TO NUMBER.——INCISORS, HOOKS, AND "WOLF'S TEETH."——HOW TO DETERMINE AGE TILL FOAL IS TWO YEARS OLD.——HOW FROM TWO TO OLD AGE.——THE HORSE OF MEDIUM SIZE TO BE TAKEN AS A STANDARD.——SHOOTING UP AND GRINDING OFF.——IRREGULAR TEETH; HOW TO JUDGE.——PECULIAR HARDNESS OF BONES AND SLOWNESS OF CHANGE IN CERTAIN BREEDS.——THE MULE; AGE HARD TO FIND OUT WITH EXACTNESS.——DECEPTIONS; HOW TO DETECT.——CRIB BITERS; HOW TO EXAMINE.——TERMS DEFINED.

The age of a horse is to be accurately determined only by an examination of the teeth, with a knowledge of the changes which, from time to time, take place in them. The following directions, studied in connection with the drawings exhibited on the accompanying chart, and the explanations written under them, will enable any one of ordinary acuteness and powers of observation, to judge for himself, and thus to avoid that most common of all the jockey's impositions, a liability to be deceived in the age of horses held for sale.

The incisors furnish the chief indications; and to them the attention must be mostly directed; but the back and hook teeth should be observed to some extent, as their condition may occasionally serve to correct and more frequently to corroborate the indications of the incisors.

When first foaled, the colt has no incisors. Twelve back teeth have in most cases forced their points by this time through the gums; but it is not until from two to three months afterward that the four nippers appear; in six weeks the nippers are seen: and in about eight months the four corner teeth. There are now, at eight or nine months old, twenty-

four teeth, (upper and lower), called *foal-teeth*. These are all changed by the fifth or sixth year, and those that follow are called *horse-teeth*.

The back teeth appear as follows: the three front double pair are seen at birth, and are afterward changed; the fourth double pair appear from the eighth to the ninth month; (this fourth double pair are the first that remain stationary, and they are found in every year-old colt); the fifth double pair, or fifth four, appear in the second or third year; the sixth, usually in the fourth or early in the fifth year. These three double pairs of back teeth (last named), remain unchanged, as do also the four hook teeth.

The hook teeth are uncertain as to time of appearance, coming sometimes at the end of the third year, sometimes in the middle or at the end of the fourth, sometimes in the middle or at the end of the fifth, sometimes at the beginning of the sixth.

Observe particularly that the incisors of the foal differ from those of the horse: (1) By their regular, conical formation; (2) by a narrow contraction called the neck, visible almost in the center of the body of each tooth, while nothing of the kind is seen in horse-teeth; (3) by their smaller size, even when full grown. The milk teeth, (or those teeth which are cast or shed), taken from the jaws of dead foals and compared with horse-teeth similarly obtained, are found to be only about half as long as the latter. The breadth is not to be depended on, since the milk teeth of large foals appear almost as broad as those of small horses. When the nippers become horse-teeth, they form a great contrast to the middle and corner teeth. The size of these last will at once show them to be milk teeth. (4) By the fact that the outer surface of the foal-teeth is smooth and striped with brown, while on horse-teeth the same surface is divided by a dirty yellow indentation inclining toward the center, which is sometimes double upon the upper teeth.

One should study the form of the incisors by carefully examining those taken from dead horses of different ages. Each incisor will be found to consist of a hard, enamelled part, called the grinder, which has protruded above the gum; of a bony substance, which has been for the most part hidden in the gum; and of a root, which has occupied the cavity of the jaw-bone.

These teeth, (of the foal as well as of the horse), are slowly but continually worn away by biting and chewing, so that the length is constantly decreasing,—sometimes evenly and regularly,—so that in old age the tooth that was once two and a half or three inches long is found to be not exceeding half an inch in length. The breadth generally decreases in about the same proportion; but with this difference in foal and horse-teeth, that the thickness and breadth of foal-teeth are constantly decreas-

ing from the grinder or hard enamelled part to the end of the root, while horse-teeth decrease from the root upward. The grinder, or hard, grating portion of the tooth, which has not yet been used, has somewhat the form of an egg; it is three times as broad as thick, and hollowed out in the shape of a funnel, which hollow has two sharp edges inclosing it. This socket or hollow is called *the mark*. In the center of this mark, a sort of kernel may be seen—a tube commencing at the end of the root—that contains the nerves of the tooth; but this inner hole must always be distinguished from *the mark*, which is the outer depression, lying next to the sharp edges. The inner cavity is a funnel-shaped socket, of hard, enamel shell, around which, and inside the outward shell, is a thick fluid, which remains during the life of the tooth, becoming, by degrees, gray matter. This fluid averages about four lines in depth in the lower incisors and about eight in the upper ones.

The outer edge of each incisor always rises a line or two above the inner edge; therefore, when the upper and lower are first grated together, only the outer edges touch for some time; and the inner edges do not touch until the outer ones are worn down to an equal height with them. Horse-teeth generally do this in about one year. At the age of two and a half, the teeth begin to change, and those which then appear are called *Horse-teeth*. (See chart, Fig. 7, A).

A full grown stallion or gelding has 40, and a mare 36 teeth—the male having four hook teeth which are lacking in the female, except that sometimes she has imperfect teeth in the corresponding part of the mouth. Those teeth found in some young horses, next to the first double teeth, and called "wolf's teeth," are not included in this number, as they are not real teeth,—frequently not breaking through the gums at all, and usually, in any case, disappearing in eight or nine years. Twenty-four of the true teeth, in both horses and mares, are situated in the upper part of the mouth, (that is, in both jaws, *above the lips*). They are divided into six double pairs, counting upwards from below, so that those situated next to the incisors in all the four rows are first; those next to them, second; and so on to the last pair, which are called back teeth.

Twelve others are in the lower part of the mouth, surrounded by the lips, six in the upper and six in the lower jaw, standing, each lot, in the form of an arch, and occupying the entrance to the hollow of the mouth. These twelve are called incisors. The four innermost, two in each jaw—those forming the key of each arch—are called nippers; the other two in each arch are called corner teeth; and those between the nippers and the corner teeth are called middle teeth. Each of these teeth in the lower jaw rubs against the corresponding one in the upper jaw. The teeth of the upper jaw are broader and thicker than those of the lower. The four

hooks are seated alone, over each corner tooth, but nearer to the corner teeth of the upper than those of the lower, so that they, (the hooks), never come in contact with each other.

The horse has always attained the age of four and a half or five years before he has a full number of perfect teeth. Before this time, the younger the animal the fewer the teeth, and even these are not all permanent.

The more a permanent incisor loses in length, by friction, the more it also loses in width, so that the nearer the friction surface approaches to the root, the narrower and thicker it must appear.

Every new hook tooth is cylindrical and somewhat hooked, with a cone-shaped projecting grinder, and this is surrounded by a spoon-shaped edge, turned toward the hollow of the mouth, so that the cone cannot be seen from the outside; and the whole grinder, or hard, enamelled part, has the appearance of the back part of the bowl of a spoon—the edge, like a screen, surrounding the short cone, but so that two deep furrows remain between. Except this grinder, the rest of the body is uniformly round, and the surface almost even. As previously said, however, these by themselves afford no reliable indication as to age.

Figures 2, 3, 4, 5, 6 show how the age of a colt may be determined till he is two years old. The following further explanations, taken in connection with the chart from Fig. 7 to Fig. 46, inclusive, will teach how the age, from two to thirty, can be ascertained.

Large horses have, of course, larger teeth than small ones: but taking a horse of medium size as a standard, one can make allowances for either larger or smaller, and easily arrive at just conclusions.

The incisors being our main reliance, our remarks must be understood to refer chiefly to them. The length of the tooth of a horse of medium size is three inches, or thirty-six lines. After the changed tooth has arrived at its proper length, *it shoots up a line* regularly every year, and if the teeth stand right, *the grinder is worn off a line every year*. It is also, as has been said, worn off in both width and breadth, so that the grinder becomes, from year to year, shorter and smaller, as shown by the chart.

If, however, the teeth stand too far forward, (irregular teeth, see chart, Fig. 11), they do not wear down in the same proportion as they shoot upward, and they become very long. The age in this case can be ascertained with ease and exactness by observing directions given under Fig. 41, and noticing with care the following points: At the age of five years, the corner teeth of the lower jaw have grown up five lines above the gum; each middle tooth, seven lines; and each nipper, nine. At eight years, and older, each corner tooth of the same horse projects only

four, the middle teeth, six, and the nippers, eight lines above the gums. This is absolutely necessary to be taken into account, because it is the only means by which one can decide with certainty as to the age of a horse whose teeth have become longer than they would have been if set right and wearing regularly.

The foregoing remarks and directions are based upon the assumption that there is no peculiarity about the individual animal or the breed to which he belongs that would materially interfere with the principles laid down. It remains, however, to notice that to those breeds of horses which develop very slowly, of which the Spanish horse may be cited as an example, the rules are a little more difficult of application. The bones of these, and perhaps of some few other kinds, seem to be harder, and the teeth change somewhat later and appear to wear down more slowly; so that it sometimes happens that such horses, after their fifth year, appear a year or two younger than they really are; but the same animals are apt to be more than ordinarily strong, hardy, and long-lived, and to be taken at a diminished age really detracts nothing from their worth.

The age of a mule is somewhat difficult to determine with exactness, owing to the cause just stated.

Deceptions may be practiced with very thrifty young horses, when it is desirable to make them appear of suitable age for work or for breeding, by knocking out the incisors a year sooner than they would naturally change themselves. If a purchaser suspects deception, he can determine the matter by closely examining the remaining teeth. If the nippers have changed, and the inner edges of the corner teeth have not yet come into contact, the foal is but one year old — and so on.

The opposite cheat — that of trying to make a horse appear younger than he really is by burning artificial marks in upon the teeth — can be detected by closely examining the enamel and the effect of the mark upon it. When a horse has reached an advanced age, say twelve to twenty, the enamelled surface has become so minute that burning in as large a mark as is found in horses considerably younger would disturb the whole enamel and so leave a means of detecting the fraud.

In the case of crib-biters, that wear out their teeth prematurely, and so appear really older than they are, examination must be directed to the corner teeth, which are seldom injured; or, if the corner teeth prove to be injured, deduct from the apparent age as many lines as are wanting to make the teeth of the natural length. To feed constantly, from weaning time, upon hard, unshelled corn, sometimes produces the same effect as crib-biting, and the same directions must be followed in forming an estimate.

We close the chapter with a short vocabulary, by reference to which the reader may more readily apprehend the meaning of the terms employed in the ensuing chart.

Incisor.—A cutter; a fore-tooth which cuts or bites. In the horse, those twelve teeth, six in the upper jaw, six in the lower, which are surrounded by the lips, are called incisors.

Grinder.—As used in the present chapter, it denotes the hard, grating, upper portion of the front teeth.

Line.—One-twelfth of an inch.

Mark.—As used with reference to horse teeth, it denotes that depression in the grinder lying inside the sharp edges and adjacent to them.

Nippers.—Those two teeth in each jaw that occupy the middle of the semi-circular row.

Corner Teeth.—The two outer of the six front teeth in each jaw.

Middle Teeth.—The teeth between the nippers and the corner teeth.

Hooks.—Four teeth, two in each jaw, situated over corner teeth, or beyond the incisors, reckoning from the front of the lips, and having a cylindrical and somewhat hooked shape.

Milk Teeth.---The front teeth of a foal which appear at about three months of age and are cast within two or three years.

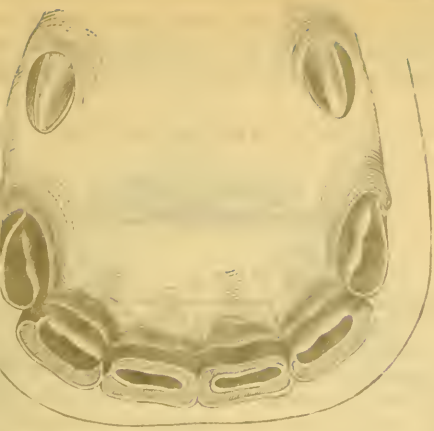

Fig. 11. Four-and-a-half Years.

Appearance of the lower jaw at four-and-a-half
the corner teeth and hooks are breaking through
teeth are worn only on the outer edge; while the
worn down at both edges.

Fig. 12. 5 Years Old.

Outside and side view of the lower jaw at five

CHART for Accurately Determining the Age of a Horse from 6 Months to 20 Years.

COLT'S TEETH.

FIG. 1.

The right side of the milk incisors of the lower jaw is here shown, of natural size and fully developed. *A, B, C* show the concave side of these teeth towards the hollow of the mouth. The mark of change, or age, is inclosed within the outer edge d *A* f; d *B* f; d *C* f; and the inner and rather lower one, d e f. The different kinds are *a*, the nippers; *b*, the middle teeth; *c*, the corner teeth; and the different parts shown are *g*, the hollow inside surface of the body of the teeth; *h*, the contracted body of the teeth; *i*, the narrow neck; *m*, the root. The surface is represented as arched on the outer side.

FIG. 2. HALF YEAR.

Both the outer

Lower jaw of a colt a half year old.

and inner edge of the nippers are worn; of the middle teeth, only the outer edge; the corner teeth are not worn at all.

FIG. 3. HALF YEAR.

This represents the outer side of th year old colt. The different teeth are jaw of a half the nippers; *b, b*, the middle teeth; as follows: *a, a*, the corner teeth.

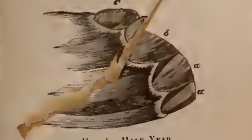

FIG. 4. HALF YEAR.

This is a side view of the jaw of a half year old colt.

FIG. 5. ONE YEAR OLD.

This is the appearance of the lower jaw at one year old. The edges of all the *incisors* are partly worn by friction, while the corner teeth remain unInjured.

FIG. 6 TWO YEARS OLD.

Appearance of the lower jaw at two years old. The edges of the nippers and of the middle teeth, and their mark, are worn down, so that the inner edge of the corner is brought into requisition.

The teeth begin to change at two-and-a-half years, and the permanent or horse teeth appear.

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HORSE-TEETH.

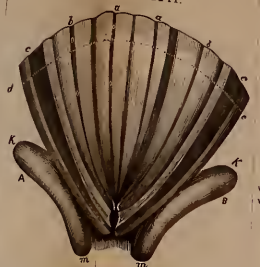

FIG. 7. A.

Appearance of the horse incisors in place, with their outer surface arched toward the bony blade of the socket, as follows: *a, a*, the two nippers; *b, b*, the two middle teeth; *c, c*, the corner teeth; *k, k*, the hooks. The cavity in the outer portion of the mark is indicated by *e*, *d*; the furrows which distinguish the horse teeth by *o, o*; and the roots of the hooks by *m, m*.

FIG. 7. B.

Appearance of the incisors in the lower jaw, from the inside of the mouth, in their position relative to the jaw bone. The wearing of the outer and upper edge of the nippers, *a, a*, is visible on the right side, where they come in contact with the edge of the left side. The right side of the outer edge of the two middle teeth, *b, b*, is beginning to be worn; the inside remaining uninjured. The crown of each tooth, projecting above the gum, is shown by the dotted lines. The hooks, *k, k*, are about to break through. The roots *m, m, m, m*, are seen to be not yet filled out with bony substance.

FIG. 8. A, D.

Appearance of a nipper at different stages. *I* shows it breaking out afresh at the age of three years, its breadth marked by 1, 2, its thickness by 3, 4. *II* shows the friction surface as it appears at the age of six, the crown cut off one-fourth inch, where the breadth, 1, 2, begins to decrease, and the thickness, 3, 4, takes the form of an egg. *III* shows a rounder friction surface of twelve years old. The breadth and thickness are now becoming proportionate. *IV* shows a friction surface of eighteen years old. *V* shows a friction surface of 24 years, in which the breadth, 1, 2, measures only half as much as the thickness, 3, 4. *D* shows an incisor of a full grown horse, split lengthwise, of which *d, e, f* is the outer raised edge; *a, b*, the funnel-shaped cavity of the tooth; *b*, the hollow body; *m*, the still unfilled root of the tooth.

FIG. 8. B, C.

Appearance of horse incisors, (viewed from the side,) in which the body, *e, e*, are twice as thick as the upper end. Also, of two foal teeth, *b, c*, raised out of the socket and viewed from the side.

FIG. 9. TWO-AND-A-HALF YEARS.

Appearance of the lower jaw at two-and-a-half years old, in which two nippers are breaking through anew, as true teeth, while the foal teeth appear as a smooth friction surface.

FIG. 10. THREE-AND-A-HALF YEARS.

Appearance of the lower jaw at three-and-a-half years old, when the middle teeth are just breaking through; the outer edge of the nippers already worn down; and the corner teeth blunted.

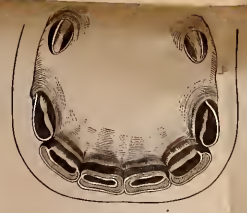

FIG. 11. FOUR-AND-A-HALF YEARS.

Appearance of the lower jaw at four-and-a-half years old. The corner teeth and hooks are breaking through; the middle teeth are worn only on the outer edge; while the nippers are worn down at both edges.

FIG. 12. 5 YEARS OLD.

Outside and side view of the lower jaw at five years old.

FIG. 13 5 YEARS OLD.

Outside front view of the lower jaw at five years old.

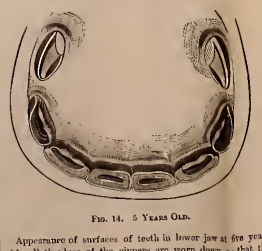

FIG. 14. 5 YEARS OLD.

Appearance of surfaces of teeth in lower jaw at five years old. Both edges of the nippers are worn down, so that the mark is almost gone; the middle teeth are worn only on the outer edge; the corner ones have attained the same height as the others and have also come into wear; and the hooks are in full grown, but not worn at all.

FIG. 15. 6 YEARS OLD.

Appearance of the lower jaw at this age. The nippers are worn down even with the middle teeth; the middle teeth have still a cavity; the inner edge of the corner teeth has worn down even with the outer one.

FIG. 16, 7 YEARS OLD.

Appearance of the lower jaw. The middle teeth have become even; both edges of the corner teeth rub, but they have still a small cavity; the hooks have lost more of their edges and their pointed ends are more rounded. The hooks, however, as has been said, can be depended on only when their indications agree with those of the other teeth.

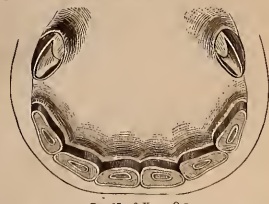

FIG. 17. 8 YEARS OLD.

Appearance of lower jaw at this age. The incisors have all become equally worn; in the corner teeth a mere trace of the mark is visible; and the edges of the hooks are worn down almost half their height. Notice always that the marks in the *upper* teeth are twice as deep as those in the lower ones, and so wear twice as long.

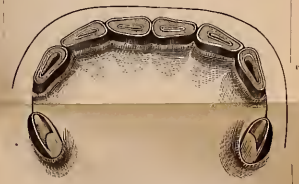

FIG. 18. 9 YEARS OLD.

Appearance of the upper jaw at this age. The marks of the nippers have almost disappeared; the middle teeth still show a slight mark; the corner teeth have a deeper mark than the middle ones; the inner edge of the teeth is also worn down.

FIG. 19. 9 YEARS OLD.

A side view of the upper jaw at this age The depression usually found in the corner teeth may be seen at *d*.

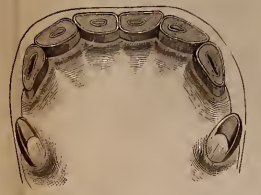

FIG. 20. 10 YEARS OLD.

Appearance of the upper jaw at this age, when the mark of the middle teeth is worn down.

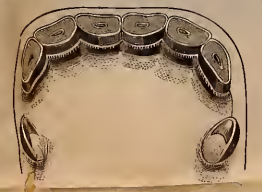

FIG. 21. 11 YEARS OLD.

Appearance of the upper jaw at this age. The mark of the corner teeth is worn down.

FIG. 22 12 YEARS OLD.

Appearance of the lower jaw at this age. The nippers have become round—as thick as they are broad; the middle teeth are approaching this state; and the corner ones increase in thickness.

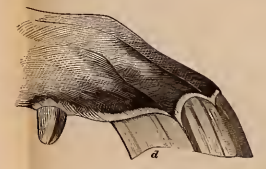

FIG. 23. 12 YEARS OLD.

This is a side view of the upper jaw at this age. The increased depression in the corner teeth is seen at *d*.

FIG. 24. 13 YEARS OLD.

Appearance of the lower jaw at this age. The nippers and middle teeth have become perfectly rounded; the corner teeth are of increased thickness; and the hooks have become blunt.

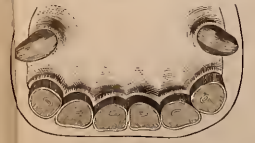

FIG. 25. 14 YEARS OLD.

Appearance of the lower jaw at fourteen. The corner tooth has become round.

FIG. 26. 15 YEARS OLD.

Appearance of the upper jaw at fifteen. The nippers are rounded.

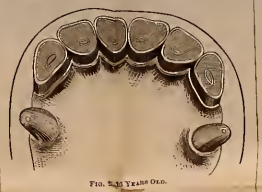

FIG. 27. 16 YEARS OLD.

Appearance of the upper jaw at sixteen. The middle teeth are rounded.

FIG. 28. 17 YEARS OLD.

Appearance of the upper jaw at this age. The corner teeth are rounded.

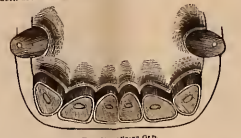

FIG. 29. 18 YEARS OLD.

Appearance of the lower jaw at this age. The nippers are triangular.

FIG. 30. 19 YEARS OLD.

Appearance of the lower jaw at nineteen. The middle teeth are triangular.

FIG. 31 20 YEARS OLD.

Appearance of the lower jaw at this age. The corner teeth are triangular.

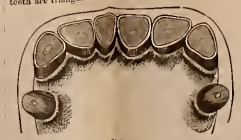

FIG. 32 21 YEARS OLD.

Appearance of the upper jaw at twenty-one. The nippers have become triangular.

FIG. 33. 22 YEARS OLD.

Appearance of the upper jaw at this age. The middle teeth have become somewhat triangular.

FIG. 34. 23 YEARS OLD.

Appearance of the upper jaw at twenty-three. The corner teeth have become triangular.

FIG. 35. 24 YEARS OLD.

Appearance of the lower jaw at this age. The nippers have become twice as thick as broad.

FIG. 36. 25 YEARS OLD.

Appearance of the lower jaw at twenty-five. The middle teeth have become twice as thick as broad.

FIG. 37. 26 YEARS OLD.

Appearance of the lower jaw at twenty-six. The corner teeth are twice as thick as broad.

FIG. 38. 27 YEARS OLD.

Appearance of upper jaw at twenty-seven. The nippers are twice as thick as broad.

FIG. 39. 28 YEARS OLD.

Appearance of upper jaw at this age. The middle t eeth are twice as thick as broad.

FIG. 40. 29 YEARS OLD.

Appearance of the upper jaw at twenty-nine. Th e corner teeth are twice as thick as broad.

Horse Teeth. Irregular.

FIG. 41. 20 YEARS OLD.

Teeth shoot up a line every year; but when they stand forward too far in the mouth they cannot wear down in the same degree. In order to ascertain the age of such a horse, examine the mark narrowly, and add the number of lines extra to what the mark indicates. Thus, if the mark shows *eight* years, while the teeth are *four lines too long* for that age, the true age is 12 years. In Fig. 41, the mark shows eight years, but is twelve lines too long. Add these to the eight, and you have the horse's age, twenty years.

FIG. 42. 20 YEARS OLD.

Inside view of lower jaw, (teeth irregular), at 20 years. The friction surface shows eight years. (See Fig. 43).

FIG. 43. 20 YEARS OLD.

Same as Fig 42, but with superfluous length, twelve lines, removed. The friction of twenty years is seen on upper section of illustration.

FIG. 44. 20 YEARS OLD.

Real length and outside appearance of the teeth in lower jaw at twenty.

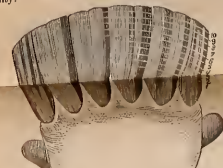

FIG. 45.

Appearance of a lower jaw in which the teeth are ten lines too long.

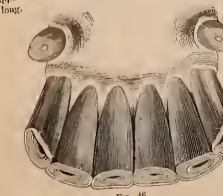

FIG. 46.

Inside view of lower jaw. The mark shows six years; but the teeth are ten lines too long, and the age is sixteen. When horses are large and naturally have larger teeth than smaller ones, the other signs remain the same, and the age is easily determined.

☞See Chapter III *for explanation of terms, and further facts concerning the Age of Horses.*

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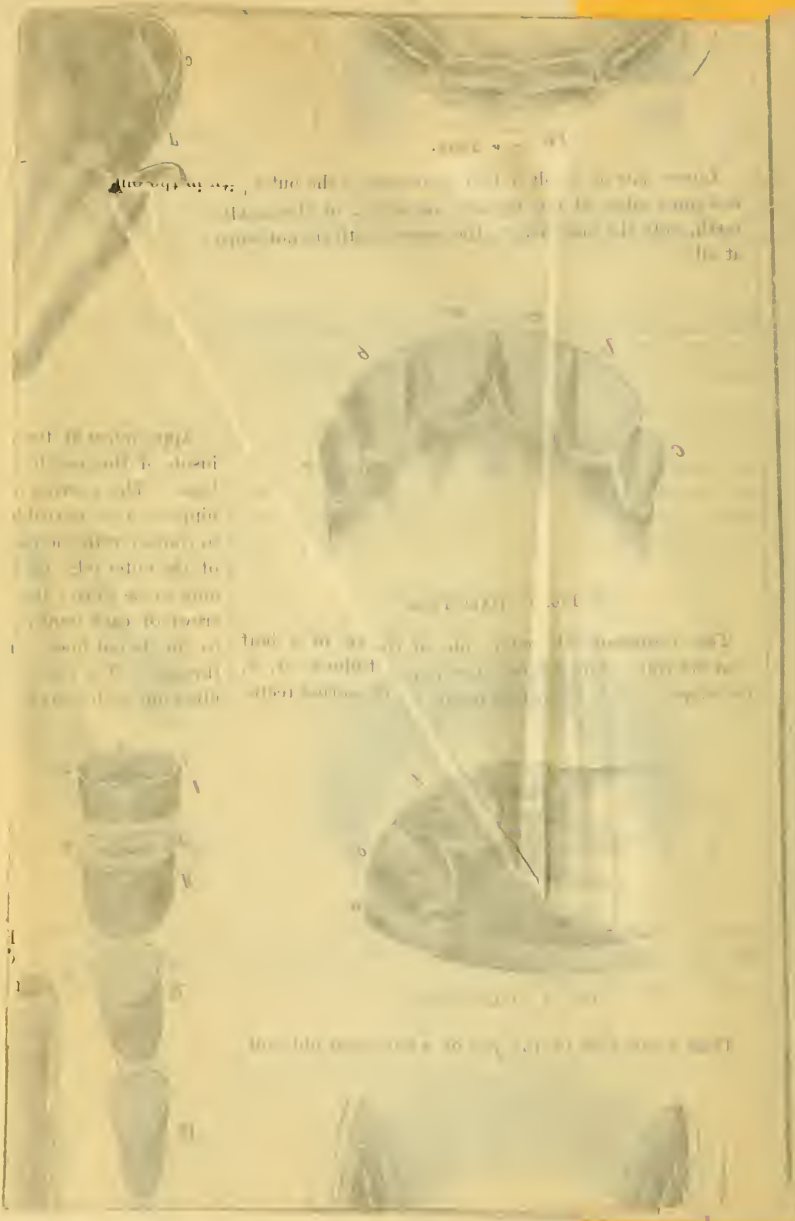


CHAPTER IV.

DIFFERENT BREEDS AND THEIR CHARACTERISTICS.

I. THE INFERIOR VARIETIES: MANY FOUND IN BOTH HEMISPHERES. SOME GOOD, BUT LITTLE KNOWN OF THEM.——II. SOME CONSIDERED AS TO WORK RATHER THAN BREED; THE FARM HORSE; THE HUNTER; THE HACKNEY; HORSES FOR HEAVY DRAFT.——III. THE ARABIAN.——IV. THE BARB.——V. THE ENGLISH THOROUGHBRED.——VI. THE PERSIAN.——VII. THE TURK.——VIII. THE TURKOMAN.——IX. THE EGYPTIAN.——X. THE DONGOLA.——XI. THE NORMAN PERCHERON.——XII. THE THOROUGHBRED IN AMERICA.——XIII. THE MORGAN.——XIV. THE NARRAGANSETT PACER.——XV. THE CANADIAN.——XVI. THE CONNESTOGA.——XVII. PONIES.

I. The Inferior and Little Known.

Among the great variety of horses there are many that are either of inferior importance or so little known that it is deemed unnecessary to notice them in detail. India, China, Japan, Siam, several of the European States, and North and South America, have horses that are in some instances widely different from each other, as well as from the approved breeds; but they are not known to possess any remarkable excellence, or any distinctive points that are constantly reproduced in their offspring,—so that a mere casual reference to them, with very general statements as to qualities and characteristics, is considered to be sufficient.

In India alone there are various stocks, known to have been so long in the various regions of that great country as to seem native to the soil; but with the exception of the Turko, recognized to be a cross between the Turkoman or South Tartary breed and the Persian, they are regarded as cold blooded and inferior. The Turko is said to carry himself in a grand and stately way, and to be both beautiful and tractable.

The Tartar and Calmuck horses, with the exception of the Turkoman, which is described elsewhere in this chapter, are for the most part small and ill-made. They are hardy, however, being able to perform great journeys, with burdens disproportioned to their size, and to live on the poorest fare.

The horses of China are small, and have no points of excellence as to either shape or spirit.

The horses of Turkestan have been described by some as having heavy heads and ewe-necks, with long legs and a scanty body; while others speak of high crests and long, bony bodies, and assert these horses crossed with those of Persia, produce magnificent animals—elegant, active, strong, and larger than the best Arabians. In Bokhara is a breed of small and shaggy but stout horses, called Kussaks, which has attracted some attention. Their manes and tails are long as compared with their general make up.

Belgium, Holland, and the German states have breeds of horses noted only, or chiefly at least, for being large, strong, and well-formed, and admirably adapted to purposes of heavy draft.

In the forests of Sweden, Finland, and Norway is found a race of horses in a half wild state, from which the inhabitants, without taking upon themselves the trouble of breeding and rearing, supply themselves when the creatures are wanted for use. They are small, but well-formed, active, and spirited.

The Hungarian horse, though evidently of the same origin as those of Germany, is somewhat lighter than they, and possesses more spirit and action. He shows some signs of oriental blood, to which he probably owes his superiority to his neighbors.

The horses of Iceland run at large and pick up their own scanty fare, wherever they can find it, until they are needed by the inhabitants, when they are caught and subjected to use. The origin of these animals is in doubt. Some assert that their progenitors were carried into that island from the forests of Sweden; others, that they were of the stock of ponies found in the Scottish isles. They are small, but active, and generally well disposed.

The horses of Italy were formerly much better than now. Few of them may at present be regarded as possessing any striking excellence. There are said to be some, among the people of Naples, that are large, of fine appearance, and excellent as carriage horses.

The French people have many breeds, adapted to the saddle, the light carriage, cavalry, and light artillery, besides those that are required for the plow and the cart. The most famous among them is the Norman, or Norman Percheron, which is described elsewhere in this chapter.

The fact is well established that the horses of Spain, previous to the Moorish conquest, were possessed of many noble qualities; but they were much improved by a mixture of Barb blood, consequent upon the invasion and the introduction of horses from the Barbary States. They

still show both their original and derived excellences; and a pure-blood Spanish Barb is a fine and beautiful creature.

In the plains of South America, Mexico, Texas, and the Western Territories of the United States are found great herds of wild horses, of which there are different varieties, though they must have had a common origin, as we have stated in chapter I. Chance mixture with horses imported into the country subsequently to those brought from Spain, together with the influences of different climates and food to which they have long been subject, may perhaps account for this. The most marked types of these wild Americans are the Mustang and the Indian ponies, which are noticed on succeeding pages. As a general thing they retain the striking characteristics of their old Spanish or Andalusian progenitors; in size, shape, and spirit they show whence they are derived. Their heads are pretty and their limbs clean. They are capable of great endurance; and though not especially rapid in action, it is related of them that they are sometimes ridden at the rate of ten or twelve miles an hour for a stretch of eighty miles, without anything more than a temporary halt and such little food as could be hastily eaten. Seldom is any gait known among them except a walk and a lope; but an occasional pacer is discovered. Many of them do well for the saddle; but care is required in handling them. In the hands of the cruel or inconsiderate, their wild nature returns to them, and they become intractable and even dangerous.

II. Some Considered as to Work, rather than Breed.

In treating of the different stocks and specifying distinguishing points, it is perhaps not amiss to consider some characteristics that should mark animals chosen or set aside for special purposes.

The good *farm horse* cannot, of course, be confined to any particular breed. If he combines within himself certain desirable qualities, it is not pertinent to inquire particularly what blood he carries. Some points that should distinguish him may be thus enumerated: He should be close-built and strong, but not gross and clumsy, since he is to serve as a sort of horse of all work—doing duty, by turns, under the saddle, and before the plow, the farm-wagon and the carriage.

A Good Farm or Every Day Horse.

Fifteen to sixteen hands mark the proper stature; and his limbs should be sinewy without absolute heaviness, while his feet should be of medium size. He should be reasonably springy under the saddle, and active, without dash, in light harness. To these he should add a certain thriftiness, that will enable him to appear well even under good, close work, if well treated; and in temper he should be mild. His breaking in and training should have been such as to render him readily adaptable to any work that he may be called upon to perform about the country home.

The *hunter*, or horse for the chase, speaking with reference to a pastime which is still common in England, but to which little or no importance is attached in this country, is usually the better esteemed for having some blood, but more for the absolute feats of speed and leaping which he may be able to perform, and for his ability to stand a hard day's run.

The best hunters are said to be a combination of the thorough-bred with some coarser animal—producing more strength, substance, and hardihood, with less length of body. He is at the present time what may be called three-quarters bred; and he is lighter and more fleet than formerly.

The accompanying engraving, entitled "A light hunting horse," conveys an excellent idea of what he is now most commonly found to be.

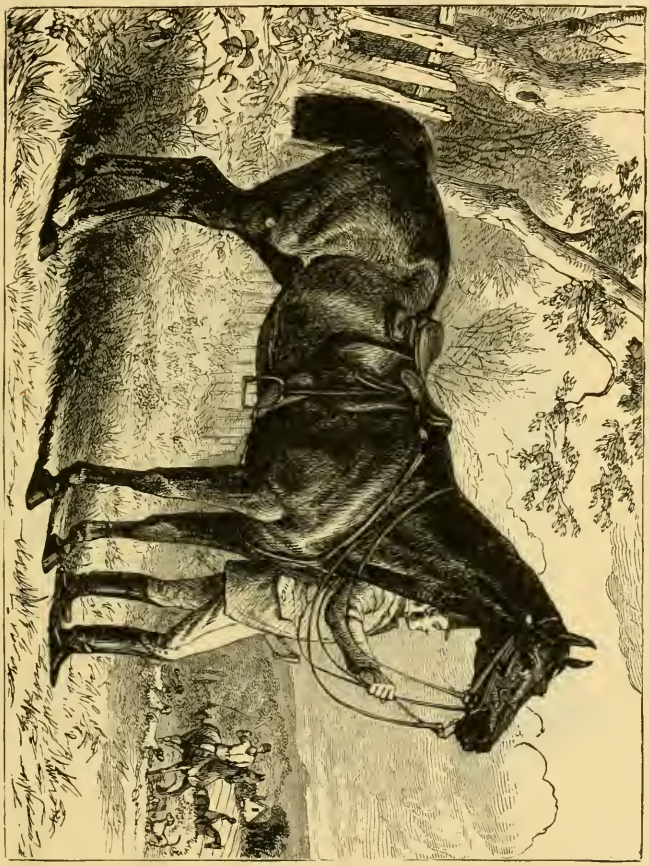
That is to say, a horse of good style and form, capable of long continued exertion under the weight of an ordinary sized man, and also capable of showing as high a rate of speed as possible, combined with an aptitude to leap successfully such obstacles as may ordinarily interpose. In all this class of horses, whether they be light or heavy weight animals, blood—that is, the possessor of a fair amount of thorough blood as transmitted by thorough-bred sires—is absolutely necessary. It gives style, form, hard and fine bones, muscular tissue, lung power, and all this means endurance to perform feats under which the cold blooded horse would soon succumb. Such a horse as the engraving shows will not only make a capital saddle horse, but also a most valuable horse for general utility, if properly broken, good for the light carriage and buggy and good also at a load if properly trained and handled; but let it always be remembered that in as much as you put a saddle horse, and especially a hunting horse, to labor, you detract from his value in the field.

During the last century, however, and the first of this, it was deemed essential that he should be a heavier horse—an animal capable of making

A Light Hunting Horse.

prodigious leaps while carrying a heavy weight. This type is well represented by the subjoined cut of "A heavier hunting horse."

The HACKNEY, as the horse of all saddle and light harness purposes, the common roadster, or general knock-about, is termed in England, may be considered in pretty much the same light as the good farm-horse pre-

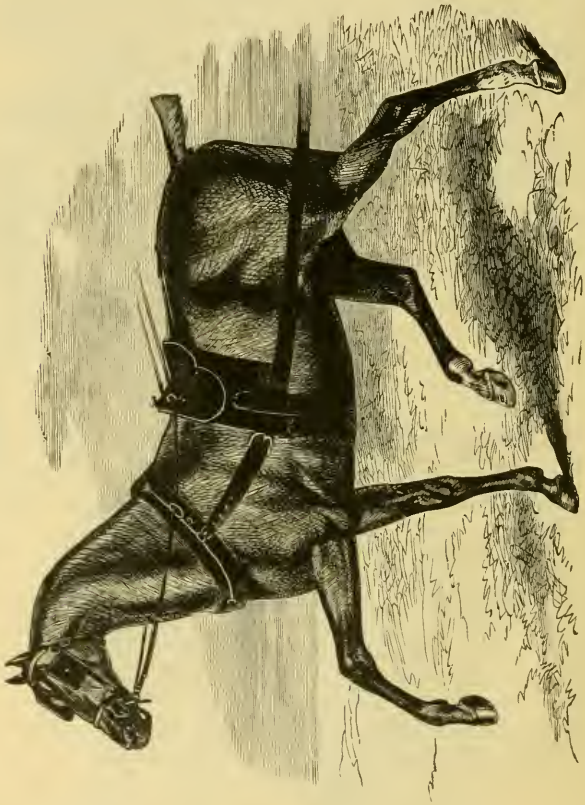


A HEAVIER HUNTING HORSE.

viously noticed. Among the English people it seems to be essential that an animal must at least be supposed to possess some blood before he can be considered a good hackney. When known, or believed, to have a

streak of the thorough-bred in him, and to possess the following characteristics, nothing more is desirable:

He must be about fifteen hands high; both his fore and hind parts must be strong and well muscled; he should be short in the back and well coupled; his chest should be wide and deep, allowing full play for



AN ENGLISH ROADSTER.

the lungs: his head should be light and his neck carried well up; his limbs should be clean and bony, and with somewhat oblique pasterns; he should be quick and springy; and in temper he should be kind and easily controlled.

Of Heavy Draft Horses there are several breeds in both England and the United States; or rather, several kinds that have some of the blood and some of the characteristics of the old heavy draft animals. When it became the fashion in England to seek admixture with the heavy mares and stallions of Belgium or Flanders, the English draft stock was really much improved, though several English breeds soon lost thereby, for the most part, their identity.

An English Coach Horse. Heavy Draft

The Cleveland Bay, a powerful horse, though not of extraordinary size, was found chiefly in the four Counties of Yorkshire, Durham, Lincolnshire, and Northumberland. He was capable of carrying a great weight, and of maintaining under it a rapid rate of speed. A lighter horse, and one better adapted to the carriage, was produced by crossing the

Cleveland mare with a good-sized thorough-bred stallion. The best hunters and hackneys, having an arched crest and proud action, were produced by crossing the Cleveland mare with a horse lighter than the true thorough-breds, yet possessing real spirit and quick movement. The Cleveland, as a distinct breed, is nearly extinct.

The Suffolk Punch is considered to be an excellent heavy draft horse. He is believed to be the offspring of the Suffolk cart-mare and the Norman stallion. When further crossed with the Yorkshire half-bred, (the product of the Cleveland Bay and the thorough-bred), he is active, spirited, and indomitable at a pull.

The Suffolk, now hardly known as a distinct breed, was a horse of good size, being ordinarily from fifteen to sixteen hands high, and very stout in proportion. His distinguishing color was sorrel; he had a large head; his shoulders were thick on top and low; his chest was round and deep; he had round legs and short pasterns; his back was long; his croup high; his flanks full; his quarters heavy and strong; and he was every way a spirited and determined animal, active and enduring.

The Clydesdale horse, found principally on the Clyde in Scotland, was the product of certain Scottish mares with Flanders stallions. He is a larger horse than the Suffolk, but less clumsy in appearance, as his head is better and his barrel lighter. He has a long neck and deep legs; and is strong, hardy, patient, and a faithful puller. Some of the horses in the United States said to be of this stock preserve most of these characteristics, but their bodies are rounder and their necks are not particularly noted for length.

Between Lincolnshire and Staffordshire, in the midland counties of England, is found what is called the Heavy Black Horse, a large, well-built animal, of splendid appearance, and much in demand in London and elsewhere as a wagon-horse; but no horses of this particular kind are known to have been brought to America for breeding purposes.

Of American heavy draft stock, the Vermont cart-horse is deserving of special mention. He is said by one who is considered good authority to exist in Vermont and adjacent States as a distinct breed, and to be the very model of what a good cart-horse should be—quick and full of power, yet easily managed. As a general thing, he has a well-set head, a lofty crest, thin withers, mane and tail medium, and clean fetlocks. He has sufficient action to insure a good rate of speed, and makes, upon the whole, a fine show.

His origin seems doubtful. There is a pony appearance about him, though often more than sixteen hands high—his peculiar shortness of back, roundness of body, and general compactness contributing to make

him seem much less in bulk than he is found to be by actual measurement.

III. The Arabian.

We come now to notice some of the most distinct, strongly marked, and valuable breeds, among which the Arabian, or that species of the Arabian best known to us, is justly celebrated.

Whether the present pure blood Arab is native to Arabia or imported; whether of recent origin or of a lineage as ancient as the sculptured ruins of Nineveh and Babylon, it is needless to inquire; but the people of that country claim that they have authentic pedigrees reaching back for more than two thousand years; while on the other hand, it is asserted by some who have tried to discover the real origin of this famous stock that prior to the thirteenth century the horses of Arabia were a poor race and lightly esteemed. Be that as it may, the horse of the present day, so renowned throughout the world, undoubtedly began to attract notice some five or six hundred years ago, since which time he has grown into his great repute; and now the best horses of most civilized lands are thought to derive their highest claims to noble descent from the Arabic Kochlani, and those of his congeners that have shared his excellences.

In a subsequent chapter the subject of breeding will be appropriately treated; but we may advert here to a singular fact in connection with the sons of the desert and the horse that shares their name and their affections. So thoroughly are the principles of breeding understood among them, or such is their extraordinary care, (and perhaps climatic influence may have something to do with it), that their horses long since reached a degree of perfection unrivalled in any country, and this perfection is steadily maintained.

Travelers differ as to the number and names of the distinct breeds of horses which are found in Arabia; but a comparatively recent Mohammedan writer, who seems to have had more than ordinary opportunities for knowing the facts in the case, has stated that there are six distinct breeds, which he names and characterizes thus:

(1) The Dgelfe, found chiefly in Arabia Felix, seldom seen at Damascus, but common in the neighborhood of Anaze. Horses of this breed are of lofty stature, have narrow chests, but are deep in the girth, and their ears are long. They are remarkable for spirit and fleetness, but are exceedingly tractable, and their ability to endure hunger and thirst is a remarkable feature. A two-year-old colt, he says, will cost in his own country two thousand Turkish piasters.

(2) The Secaloni, a breed from the eastern part of the desert, somewhat inferior to the Dgelfe, though resembling him in most points.

(3) The Mefki, he informs us, is a handsome horse; but he is not so fleet as either the Dgelfe or the Secaloni. In figure, he bears a resemblance to the Spanish or Andalusian stock.

(4) A fourth breed is called the Sabi, which is similar to the Mefki, but seems to possess no specially useful or striking qualities.

(5) The Fridi. This breed is very common; but they are often vicious and untrustworthy, and lack some of the excellent qualities possessed by the best of the others.

(6) The Nejdi, found chiefly in the region of Bussorah. These are said to be at least the equals of the Dgelfe and the Secaloni. Some judges assert that there is no horse to be compared with them, and they stand very high in the market.

This writer considers the Dgelfe and the Nejdi to be the most valuable. They are known to be the favorites of the horse-fanciers of India, many fine animals of these stocks having been carried thither by the sportsmen of that country.

Other writers make mention of but three distinct breeds, to which they attribute names different from those above given; and it is difficult to reconcile the statements of the two, and to determine whether they have really agreed in any way in pointing out the same animal, though by diverse names, as possessing the striking excellences which have made a certain breed famous and well known to us. Writers of the latter class speak of an inferior race, little esteemed, at home or abroad, which they call the Attechi. These are sometimes found in a wild state. Then come the Kadischi, a sort of half-breed stock, possessing some points of resemblance to the true blood, and being sometimes imposed upon dealers for the genuine. Finally, they describe a superb race, the pure descendants of some extraordinary ancestors, and these they call the Kochlani or Kailhan. The best of them are found among the Shammar and Aneyza tribes. The Arabs themselves pretend to trace the Kochlani back to the days and the stables of Solomon. While this cannot be credited, it is known that some of them have written pedigrees for at least four hundred years, kept with the most extreme care, and always on the side of the mare. These animals are sometimes sold to foreigners; but they bear almost fabulous prices, and it is believed to be a very rare thing for a true Kochlani to fall into the hands of a stranger.

The striking points of the pure Arab may be thus stated: In size, he is considerably smaller than the modern thorough-bred, scarcely ever exceeding in height fourteen and a half hands. His head is extraordinary for its beauty,—the forehead being broad and square, the muzzle short and fine, so that some of them seem as though they could really "stick their noses into a tumbler." The face, upon which the veins appear

beautifully coursed, is bony; the nostrils are wide; the well-set ears are small, while the eyes are large, prominent and brilliant. The neck, rising beautifully from the shoulders, and well arched, is very fine; the withers are high and moderately thin; the shoulder, inclining backward, is perfect in form and position—muscular as well as finely shaped. The body is light and narrow before; but behind the arms the chest is expanded and affords sufficient capacity for the lungs; the hips, though somewhat narrow, are well united to the back, and the quarters are strong, muscular, and well set. The legs are small, flat, sinewy; the pasterns are oblique in their position; the croup is high, while the tail is set on with considerable arch. The muscles of the arm, like those of the ham, are full and strong. The bones of the leg are large in proportion to the size, there being no superfluous fatty matter, but full, free, strong, and clean tendons and suspensory ligaments. The hocks are large, but free from both curbs and spavins; while the feet are small and sound. The elbow joint is prominent but fine, and generally plays clear of the body.

Especially does the Arab differ from other breeds in the superior fineness of his muzzle; the somewhat hollowed but graceful face; the fully developed jaws that yet give no impression of heaviness; the beautifully pricked and exquisite shape of the ear; the conspicuous neatness of the leg below the knee; and the beautiful make of the hind quarters. The fleetest among them are also noted for a straight-dropped hind leg, which is always regarded as a good point. A true Arabian has been described as "looking the gentleman all over, with a bearing as stately as that of an autocrat."

In spirit he is as noble as in his physical formation. Though kind and docile when with his native master, he is sensitive and full of spirit, and when excited is so indomitable that he would run or pull to the death rather than yield. With a cruel master he is apt to become in a measure ungovernable; but his intelligence is such that proper treatment will soon win his confidence and remove a vicious habit.

His sagacity is as remarkable as his susceptibility to kind treatment. Instances are not wanting in which his master, overcome by the heat of the desert, and lost in a lethargic sleep, has been watched over by his faithful animal, and guarded from the approach of man and beast.

The colors mostly prevalent among them are bay, gray, and chestnut. Occasionally a black is found.

He is not so swift as the best English, French, and American coursers; nor is it here that his great excellence must be sought. That arises from a combination of qualities, to some of which the best of other breeds are wholly strangers.

He is peculiarly adapted to that waste and barren country, and to the uses for which he is prized by the wandering tribes. The food and drink upon which he can live and perform great journeys would be wholly inadequate to the keeping of one of ours which we are pleased to call thrifty.

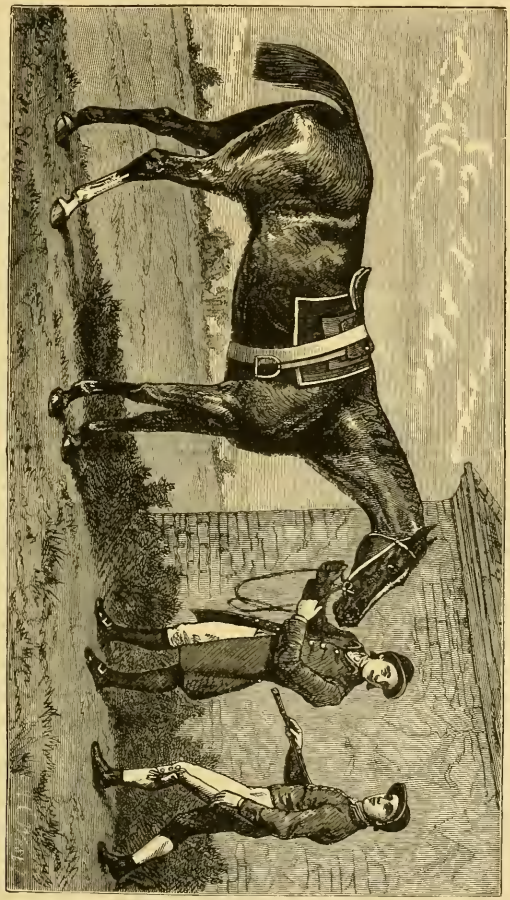
As has been said, this remarkable stock has long maintained its essential purity; nor does it show, in recent times, any tendency to degenerate. Those good Arabians that are offered for sale to British residents and other horse dealers in the markets of Bengal and Bombay command prices ranging from seven hundred and fifty to one thousand dollars; and it is said by travelers that their best mares are seldom if ever sold.

IV. The English Thorough-bred.

We have already referred to different varieties of English horses, some of which have had more or less influence upon those of our own country; but the most excellent and famous of all is the thorough-bred, or race-horse, descended chiefly from imported Arabians, Barbs, and Turks. The animal known to-day as the real English thorough-bred is perhaps of almost purely eastern origin. His excellences are derived, it is thought, from an admixture of various pure breeds, native to those regions to which the noblest of the race are indigenous, so far as either history or tradition determines. Arabia, Syria, Persia, Turkestan, Nubia, Abyssinia, and the Barbary States, all have breeds closely connected with each other, and yet possessing different characteristics; but the English race-horse is a superior animal to any of them; and his blood cannot now be improved by crossing with any known stock.

There seems to be in him a larger mixture of the Barb than of any other breed; but the earliest and most celebrated importations into England were Arabians. Much attention has long been paid there to the improvement of racing stock. The minds of Englishmen were most probably turned to this by the accession of the Norman Conquerors; at any rate, soon after the Normans were established in the island, the first Arabian of which any record has been preserved was imported. This was in 1121, during the reign of Henry I. Then, an authenticated case of importation from Arabia took place in the reign of James I. This horse was condemned, not having met the popular expectation; but the true value of eastern blood began now to be appreciated, and the White Turk was soon brought over; then a horse known as the Helmesley Turk; soon afterward, Fairfax's Morocco Barb. The interest in the improvement of racing stock then so actively manifested has never suffered more than a temporary abatement, and in no other country than in England has such success been attained. During the troublous times consequent upon the overthrow of Charles I. and the accession of the Puritans to

power, there seems to have been a decline; but a love of racing, and a corresponding desire to produce the best horses for this purpose, was



THE ENGLISH RACE HORSE, "ECLIPSE."

revived upon the restoration of Charles II. to the throne. This prince himself sent to the east to purchase brood mares and stallions, but he

affected chiefly Barbs and Turks. Many of his wealthier subjects engaged in like enterprise on their own private account.

But the most marked improvement of English stock followed the introduction into that country of the Darley Arabian, a fine and vigorous stallion imported during the latter part of Queen Anne's reign by one Mr. Darley. Several horses of great repute descended from him, of which the most noted were Almanzer, Flying Childers, and Bartlett's Childers; and from the Childers, besides numerous others, of more or less celebrity, Childers, Blaze, Samson, Snap, and Eclipse deserve special mention. Of the last named, it is recorded that though he was thick-winded or what is termed a "roarer," he never lost a race and never paid a forfeit; and that three hundred and thirty-four of his descendants proved to be winning horses.

During the reign of Louis XIV., of France, and when the Arabian stock, the descendants of the Darley, were already in high repute, a horse called the Godolphin Arabian, but which was really a beautiful Barb, of excellent spirit and action, was rescued by one Mr. Coke from the ignoble employment of drawing a cart in the streets of Paris, (where his striking characteristics seem to have been wholly overlooked), and carried to England. He is said to have been about fifteen hands high, of a brown color, and to have been distinguished by the height of his crest and for round and drooping quarters. From him is descended much of the finest racing blood in England.

We have spoken of the thorough-bred as a pure-blooded horse; and though this ought doubtless to be understood with some limitations, as even in the best of the stock there is probably some tinge of old English and Spanish blood; yet, such has been the great care bestowed upon him that he is regarded as "the eastern horse brought to the very highest state of perfection." It is certain that, as previously remarked, he is in some respects superior to the best of the original breeds. This has been brought about by long continued careful attention to breeding, to feeding, to all those points, in fact, necessary to the elimination of vicious strains and the preservation and improvement of those qualities that tend to the one great end in view—fleetness, with a corresponding power of endurance. The climate of England is said to be peculiarly favorable to the horse; and this influence has perhaps contributed something to the making of the English racer a pre-eminently fine and much admired animal. The following may be regarded as his distinguishing points:

His chest is his one and only mark of superior strength; this is wide and deep. His body is round, his flanks and belly light. His ears are fine; his eyes prominent; his nostrils are wide; his lips are small and thin, while he is remarkably wide between the jaws. He has a long and

fine neck, to which a thin mane lies close. His withers are uncommonly thin and high; his back is low at the withers, then straight to the haunches. Measured from the haunches to the turn of the rump, he is long; from the turn of the rump to the tip of the hock he is long and thin. He has great power of springing, to force himself forward, by reason of his legs standing rather under the body than erect. His buttocks rarely touch each other; his legs below the knee and hock are small, and the cords stand out conspicuously. His tail is slight and thin-haired, sometimes slightly waved; the hair of his legs is very fine; he has no fetlock tufts, and his hoof is small and cupped. His color is generally bay, brown, or chestnut; his height varies from fifteen to seventeen hands. His coat is thinner and the hair more silky than in common breeds.

The soundness of feet and legs, and the powers of endurance, which characterize the Arab, have been transmitted to the thorough-bred; and while the latter is not himself well suited to heavy harness work, or indeed to any of the general purposes of the farmer, animals are often obtained by judicious crosses with him which are admirably adapted to various uses. He is valued solely for the turf, and for light single draft, except, as we have before remarked, for the improvement of the general stock of horses by admixture; and for this latter purpose we are largely dependent upon him in America as well as in Great Britain.

V. The Barb.

The horse of the Barbary States has long been known for his excellent qualities; and he is especially remarkable for fine and graceful action. His powers of transmission are great, so that his marked traits are found in his descendants at remote periods and after commixture of various and inferior breeds.

He has impressed himself particularly upon the Spanish horse and the English racing stock. It is thought that the horses of Spain owe all their excellences to Barb blood, which was brought into that country by the Moors, at the time of the conquest.

The Barb is found chiefly in Morocco, Fez, and Tripoli, and with the exception of an excellent species found in the kingdom of Bournon, he is the only African horse deserving of special mention. The horse of Bournon is represented by some as being superior to both the Arabian and the Barb.

In addition to what has been said in those sections in which we have treated of the Arabian and the thorough-bred, the following description of the Barb will be sufficient to convey to the mind of the reader what a true horse of this breed really is:

In height, he is from fourteen to fifteen hands; his chest is round; his shoulders are broad, but light, and somewhat obliquely sloping; his withers are thin and rather high; his loins are straight and short; his flanks and ribs are round and well developed; his haunches are strong; his croup is somewhat too long for nice correspondence with the rest of the body; his quarters are muscular and full; his legs are clean, and the tendons are clearly marked; his pasterns, like his croup, are somewhat too long and slanting, but not so much so as to amount to real defect; and his feet are sound and of good shape. But his head is especially beautiful. It is small and lean, while the ears are of medium size and admirably placed. The mane is rather meager; but the neck rises boldly from the withers, and gives an impression of ease and grace in carriage.

In spirit and fleetness he is not regarded as the equal of the Arab, much less of the real thorough-bred; but in a certain native vigor and in form he is superior.

VI. The Persian.

No traveler to whose writings we have access in this country has sufficiently described the horses of Persia to enable us to point out with exactness the difference between the inferior and the better breeds that are known to exist in that country. The term *the Persian horse* is ordinarily applied to the most excellent of all, which has been celebrated for hundreds of years longer than the Arabian. At the present day, he has a large proportion of Arab blood in his veins. As a general thing, he is somewhat taller than the Arabians; and in beauty and speed he is their equal; but his powers of endurance are not so great.

VII. The Turkish.

This horse is believed to be descended from the best stock of Arabs,—crossed, however, with some breed that has given him greater proportions than his ancestors; at any rate, the Turkish horse of to-day is full sixteen hands high, often more; and he is more muscular than the Arab, though still of elegant appearance, clean limbed and active. It is asserted by some that he is descended from Arabs and Persians; and it is known that he possesses many of the best qualities of these stocks. Though strong and of sufficient spirit, he is docile, and well adapted to domestic uses.

An arched neck, with a high crest, is a striking characteristic of the breed.

VIII. The Turkoman.

As we have said elsewhere, none of the Tartar breeds except the Turko-

man or South Tartary horse are worthy to be rated among the better class of animals. He is famous for purity of blood, for good speed, and for wonderful powers of endurance. It is related that one of them has been known to travel nine hundred miles, bearing a rider, in eleven successive days. He is not really a graceful animal, however, as his head is rather large, and his legs are long in proportion to his height, which is from fifteen to sixteen hands.

Other domesticated horses among the Tartars are evidently of the same breed as the wild horses which are found in various parts of the country and in immense numbers, as the characteristics of the wild are exhibited in a marked manner in the domesticated. Indeed, it is known that these wild herds are often drawn upon for recruits when necessity drives the inhabitants to add to their stock of serviceable animals.

All these inferior creatures are small and narrow; they have long necks, apparently weak legs, large heads, and light barrels. The prevailing color is a reddish sorrel, with a black stripe along the back. Their manes and tails are black, except at the roots, where the hairs preserve this reddish cast. Their general appearance is rough and inelegant; but they are of the most hardy nature; and, contrary to appearance, they are rapid travelers. They live and even perform long and arduous journeys upon the sparsest and poorest food.

IX. The Egyptian.

It is represented by some who have devoted more than ordinary care to the study of the origin of breeds, and to the horse in his relations to various peoples and countries, that the horse of the ancient Egyptians was identical with an inferior race that afterward existed among the Assyrians. Some sculptures, found among the ruins of Nineveh, carefully executed and well preserved, portray a horse wholly different from that nobler animal carved in other bas-reliefs found in the same ruins. He is said to have been the Egyptian horse; and as thus conveyed to us, he was a large and heavy animal, having a coarse and ill-proportioned head, but a high crest.

The modern Egyptian is also of unpleasing aspect. From whencesoever derived, he is rough and ugly. Frequently his legs, knees and neck become positive defects; but a good head is occasionally found. He would scarcely be deserving of mention were it not that he is spirited and impetuous; and this, together with his weight, renders him valuable for heavy cavalry, in which capacity he has won some celebrity. His powers of endurance are not great.

X. The Dongola.

This horse is also entitled to consideration chiefly upon the ground of

his being greatly prized as a war horse. Unlike the Egyptian, however, he has not only speed but powers of endurance; and some have described him as both beautiful and tractable. Yet, even those who have had opportunities for personal observation do not agree in their descriptions and their estimates. One speaks of him as being deficient in substance and wanting in stoutnesss; while another thinks him to possess the highest type of symmetry, size, and strength. From another we get this more particular description: In height, he is full sixteen hands; his body is short; his neck is long and slim; he has a fine crest; and his withers are high and sharp; but his breast is narrow, his quarters and flanks are flat, and he has a rather ugly back.

He is found in the kingdom of Dongola and in adjacent regions.

Wild Horse of America.

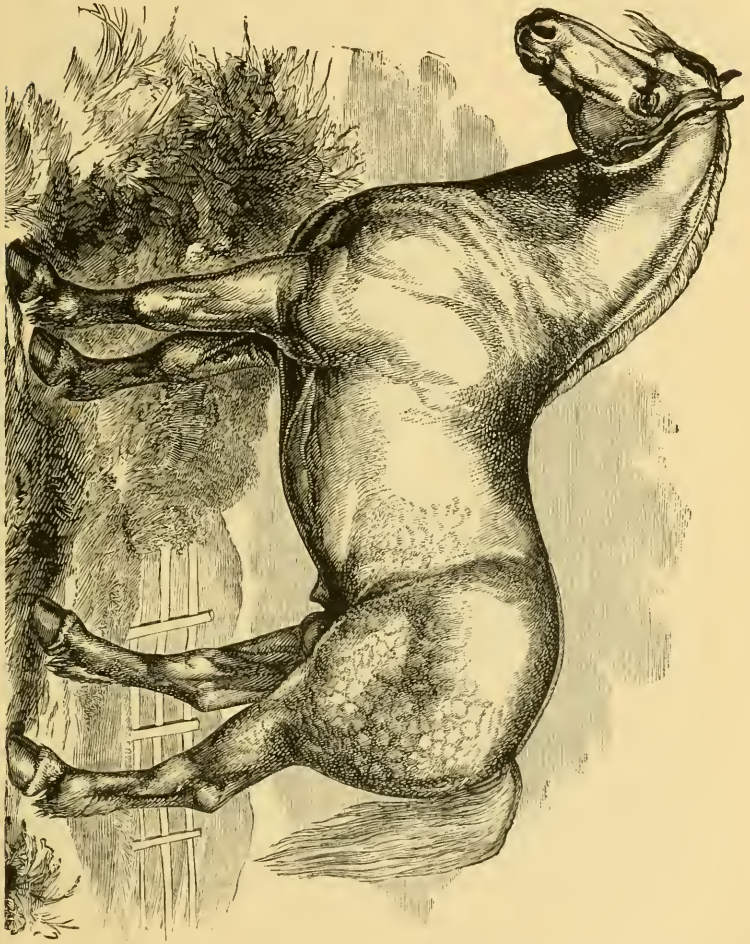
That the horse existed in America at some far distant epoch is undeniable since the fossil remains found prove this conclusively, and progressing naturally from age to age into more and more perfectly developed types. Yet at the discovery of America at the several points by the early navigators, no mention is made of native horses, as would surely have been done if such had been known to the Indians.

America is undoubtedly indebted for her wild or feral horses which have roamed the great valleys of the Pacific slope, the immense plains of the West and South-west, and the grassy portions of Mexico, to the early Spanish adventurers on the Pacific slope, as were the wild horses of the great plains and of Texas to the horses abandoned by De Soto when he turned his face eastward towards the Mississippi, after having abandoned his search for the fountain of youth and the new Eldorado. So Mexico and the Isthmus were stocked with horses in like manner, for it is futile to suppose that the increase of horses escaping from the Spanish conquerors of South America would have made their way northward through interminable and tangled forests, and mountain fastnesses, but that rather they would have betaken them to the pampas, which in reality they did. Thus in a comparatively short time they covered most areas of country with immense droves, in reality as wild and as free as though they had always existed there.

That the facts are as we have stated, is patent from the fact that the produce resembles in many close characteristics the Spanish and Andalusian horses of the early Spanish adventurers, as did those found wild in New Foundland resemble the French horse of that period; as does the Canadian pony of the present day, although diminished in size from insufficient food and the inclemencies of the climate through the long generations which have passed since their introduction into Acadia in 1604, and into Canada four years later.

XI. The Norman Percheron.

Among the striking and useful breeds, no horse has attracted more attention during the last half-century than the Norman Percheron, other-



NORMAN PERCHERON STALLION.

wise known simply as the Percheron,—a stock peculiar to La Perche, a

district in France. Volumes have been written respecting this horse, and various theories as to his origin and development have been advanced.

One writer insists that he is descended from what some call the primitive or natural horse, the pure blood Arabian, crossed with a stock of heavy draft horses existing in that section, but without historic mention, prior to the Crusades. He thinks that after the defeat of the Saracen chief, Abderame, by Charles Martel, in Vouille, in which battle a host of Saracens perished, the cavalry of the enemy, Oriental horses of marked character, true Arabs, fell into the hands of the French,—thence many of these horses were brought by their victorious masters to the districts of Normandy and La Perche. Here commixture of blood with a heavier horse of excellent quality followed, and the cross resulted in producing the now celebrated Percheron.

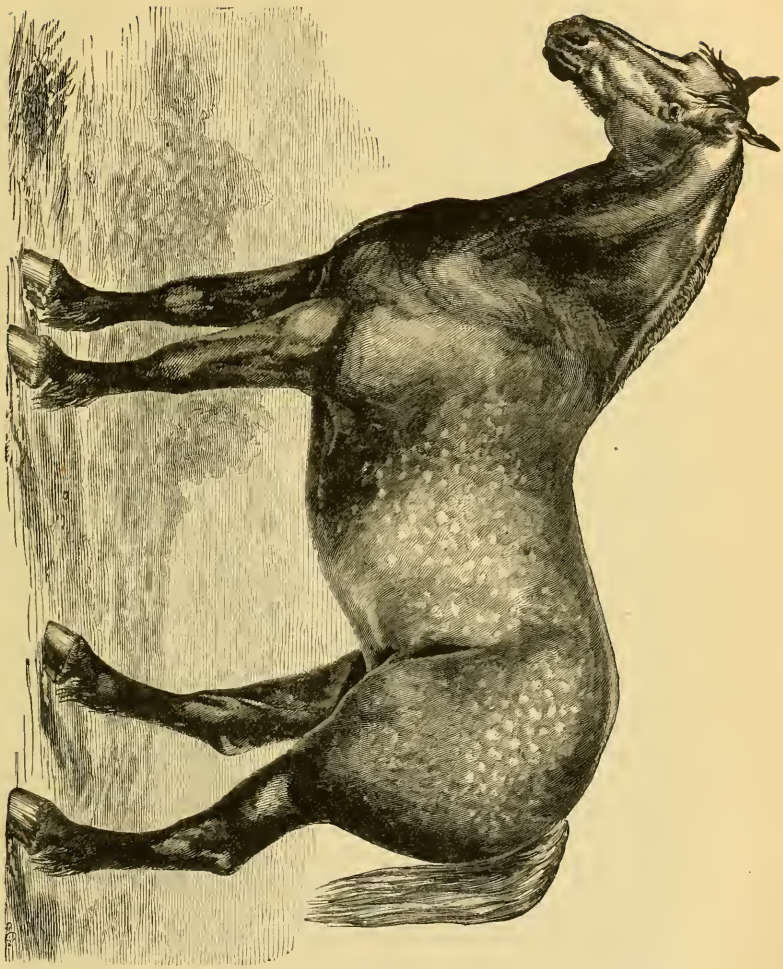
The native race referred to is thought by some to have been the old war horse of the Normans—heavy, bony and slow—good for cavalry use during the days of chivalry, when the carrying of a knight and his armor required an animal of great strength and powers of endurance.

Others think that it was a stock of horses then peculiar to Brittany and used for draft rather than for war.

One author asserts that the Percheron is descended from a remote cross between the Andalusians (after their commixture with the Morocco Barbs) and the Normans; and this somewhat fanciful reason is given for the active agency of man in bringing it about: that the Norman, though powerful, was too slow for a fully caparisoned knight—the Andalusian or Spanish Barb was too light—and a cross was effected for the purpose of securing a horse that combined speed with power.

But it is not within the scope of the present work to enter into minute particulars of this kind, nor to indulge in the discussion of mooted points that have a merely curious interest.

Whatever may have been the origin of the Percheron, it is evidently a pure race, one capable of producing and reproducing itself unchanged through a long succession of years, and without deterioration of qualities when like sires are bred to like dams. Even when the Percheron stallion is put to the service of inferior mares, he impresses himself in a remarkable manner upon his offspring, transmitting to them his own striking characteristics. Percheron mares bred to inferior stallions affect in like manner, and in almost equal intensity, their progeny—though the rule is that the stallion exerts the greater influence in determining the character of the foal.



NORMAN PERCHERON MARE.

The old Norman stock is said to have transmitted to this race their extraordinary bone and muscle, while the Arab or Andalusian or whatever may have been the cross, give the spirit and action. The Norman has

been described as being capable of carrying great burdens at a reasonable rate of speed; to have been large, compact, muscular, and possessing the greatest endurance.

The points of the Percheron may be stated as follows:

The head is short; the brow is broad, and has that hollow of profile between the eyes and nostrils sometimes known as the dish-face—(in this greatly resembling the Arab); but the head in general is not heavier than seems in keeping with the general massiveness of the frame; the neck is long, well-arched and heavy, but, like the head, not disproportioned to the general bulk. The back is short; they are well ribbed up and round barrelled; their legs are particularly short from the knees and hocks downward; they are heavily haired, but have not such shaggy fetlocks and feet as this would seem to indicate; their sinews are iron-like; and their feet are hard, sound, apparently insensible to disease. In height, they are from fourteen and a half to fifteen and a half hands, the latter being rather more than the average. Gray is the characteristic, almost the only, color.

For hard work on ordinary fare the Percheron is unequalled; and his energy and endurance are wonderful. He will keep his condition where another horse would die of hard labor and neglect. Though full of spirit, unflinching under even painful effort, he is yet docile.

In mere speed he is by no means the equal of the thorough-bred; but for quickness of movement at heavy draft he has no rival. Hitched to a light carriage or wagon he is capable of maintaining a good rate of speed for a long time together, or of making comparatively short journeys with a rapidity that is astonishing. One, carrying a light vehicle and the driver, is known to have made 55 3-5 miles over a hilly and difficult road, in four hours and twenty-four minutes; and another, harnessed in like manner, is said to have traveled 58 miles and back in two consecutive days, without being touched with the whip, occupying four hours and less than two minutes going, and four hours, one and a half minutes returning.

The Percheron of to-day makes an excellent cross with either the Arab or the English thorough-bred. For the improvement of our draft stock in the United States, no other horse is to be compared to him. Bred to good mares, this half-breed would partake more of the qualities of the sire than of the dam, and the progeny would be almost the equals of the pure French horses. Another step, bringing a pure imported stallion to the service of these half-breeds, would give us a race of horses for all work that would so far excel the ordinary race of scrubs as to seem almost like a different species of animal.

XII. The Thorough-bred in America.

The Flemish and Danish horses, large, strong, heavy draft breeds, have had more or less influence upon the horses of the United States, particularly in Pennsylvania, Ohio, and the northwestern States; but no other blood is so widely disseminated among our various stocks as that of the English thorough-bred. We have been dependent chiefly upon this animal for the improvement of the horses among us; and from a time long prior to the Revolution, it has been the custom of our most ambitious breeders to import from England both stallions and mares, but more especially the former, for this purpose.

Leonard Calvert, Lord Baltimore, sometime between 1740 and 1750, presented to a Mr. Ogle an English thorough-bred stallion, by which the colonial horse of that portion of the country was much improved; and this same gentleman, Ogle, imported Queen Mab, shortly after he came in possession of "Spark," the Baltimore horse. Selima, a mare sired by the Godolphin Arabian, was brought over by one Col. Trasker; Miss Colville, or Wilkes' Old Hautboy Mare, was imported by Col. Colville; Jennie Cameron, Crab, and others, by different persons, at various times.

It was not until within about fifty years ago that any reliable stud book or turf register began to be kept in the United States; so that it is often difficult to establish a claim to good pedigree extending beyond that time; but many valuable importations are known to have taken place previous to 1829; and the register since kept shows that there is a very large admixture of English blood in many parts of the country.

The work stock of the southern States before the war, as now, was, of course, drawn mostly from States farther north and east, and was of indifferent character; but much attention was paid in that part of the country to raising stock; and all horses raised there have more or less of the thorough-bred in them. Many really fine animals were found there, —the race-horse preserved in his purity,—but the true thorough-bred has rarely been found at any time in the northern States. In New England, the good driving horse, the horse of all work, medium sized and stoutly-built, is mostly found; in New York, they have animals representing almost every variety of breed known in the United States, and among them the descendants of many famous racers.

In Pennsylvania, Ohio, and the Northwest generally, they have a great variety of heavy draft horses—some of them of great size—not much attention having been paid, as yet, to saddle, light carriage, and race horses. In the West however, considerable improvement has been made by the introduction of fine stallions from Kentucky and Tennessee, of both the thorough-bred and the Morgan strain. In Kentucky and Tennessee, the breeds are various, but there is a very large admixture of the

thorough-bred. Their saddle, light carriage, trotting and racing stock are justly renowned. Scarcely any country in the world is better adapted to the production of fine horses than the blue-grass region of Kentucky; and it constitutes a sort of Arabia of the West, to whose breeders and trainers the buyers of the United States, sometimes even foreign gentlemen, come to purchase mares, stallions, and trained coursers.

The American thorough-bred retains many of the striking characteristics of the Arabian and his best old world representative, the English racer; and in speed he compares well with the best horses of England. He is more stoutly built, however, and capable of more endurance than the English horse.

XIII. The Morgan Horse.

A story is current to the effect that during the war of the Revolution, one of the British officers, Gen. DeLancy, rode a very beautiful stallion, of great value—said to have been a true thorough-bred. This horse was stolen by one Smith, an American, and retained within the American lines. He was the sire of a colt from a Wild Air mare; and the colt, being foaled or having become by purchase the property of one Justin Morgan, of Randolph, Vermont, received the name of his master, and his descendants have ever since been known as the Morgan horse.

The stolen stallion, called "The True Briton" or "Beautiful Bay," has been described as not only beautiful, but as having possessed great action, and being capable of leaping fences, hedges, and ditches, bearing a rider, from which it has been argued that he was not a thorough-bred, since that stock cannot jump; but he was in any event a remarkable horse, and his valuable qualities have been transmitted to his descendants. Of so pure blood and marked character was he that his powers of reproducing himself equalled those of the most unmistakable Arabian; and the Morgan blood is perceptible after various crosses, and that too, with many inferior breeds.

So marked are the characteristics of these horses, and so different are they, in some particulars, from other races, that they seem fully entitled to be considered a distinct breed. They are in great repute, also, in many portions of the country; and some efforts have been made with much success, to bring the stock back to its former and better condition, by breeding from the best and most strongly marked stallions and mares.

They are stout and hardy, while at the same time of good form—capable of performing the greatest amount of labor, and that, too, with quickness of movement. They are always in demand, and command the highest market prices.

The following may be considered the distinguishing points of a true Morgan:

In height he is from fourteen to sixteen hands; in weight sufficiently heavy for this height, with no appearance whatever of coarse bulkiness. He is compactly built, and of great strength; his action is fine, his endurance unsurpassed, and in spirit he is indomitable—never failing at a pull, if rightly handled—yet patient and trustworthy. As roadsters and horses of all work they are excellent—having no equals, perhaps, in this country. He walks fast, and many horses of this breed have been extraordinary trotters. In harness he is quiet, but nimble, and of eager movement. Bay, chestnut, and black are the prevailing colors. The mane and tail are rather heavy and coarse, and in general wavy.

The head is not extremely small, but there is no superfluous muscle or fatty matter about it; the face is straight, the forehead broad, the ears are small, fine, and set far apart, the nostrils are wide, the lips are close and firm, the muzzle is small, the eyes are not large, but very dark, prominent, set wide apart, and full of animation. The back is short; the shoulder-blades and hip-bones are large and oblique, the loins broad and muscular; the body is long, round, deep, and closely ribbed up; the chest-bone is prominent, the chest wide and deep, the legs seem rather short for the height, but they are close-jointed, and though thin, they are very wide, hard, clean, and yet with powerful muscles; the feet are small and round; the hair is short and flossy at almost all seasons; the fetlocks are moderately long, and there is some long hair up the backs of the legs.

In some parts of the country the Morgans are the premium horses, and their peculiar adaptability to all the ordinary purposes of the farmer is such that they enjoy a high degree of favor.

As a breed, they are unusually long-lived, and this constitutes one of their great points of excellence.

XIV. The Narragansett Pacer.

This breed, now almost unknown as a distinct one, was remarkable chiefly as being natural pacers, and of such peculiar action as to render them peculiarly easy under the saddle. Though small, they were hardy and full of power, and their docility was such as to render them very pleasant to handle. The stock are said to have been imported into New England, from Andalusia, by one Gov. Robinson, and to have been bred chiefly in Rhode Island, where they were long held in great repute. Good saddle horses were in much demand in Cuba, and prior to the time when the Narragansett Pacer began to attract attention, the Cubans had been dependent for their horses upon the mother country. But the voyage was long, the risk considerable, and the cost great, and when it was once ascertained that a superior saddle animal, (according to the taste of

the times), could be had in Rhode Island, much nearer home, a trade was at once opened, which continued, with much profit to the Rhode Island breeders, till the roadways of the West Indies became so much improved as to render the introduction of light carriages a natural consequence. A somewhat different horse was then required, and the trade in American stock began to decline. As the Cuban market became less and less profitable, the interest of the stock-owners experienced a corresponding decrease, till at last the effort to preserve the pacer as a distinct breed ceased altogether.

At the present day, though the influence of the Narragansett Pacer upon New England horses is in many instances perceptible, he is no longer known in his former purity.

The Vermont Draft Horse.

Vermont has given the United States one of the two celebrated families of draft horses, than which few of the breeds have combined greater excellence. Animals with lofty crests, thin withers, short backed, round barrelled, close ribbed, clean and sinewy limbed, that would at first be taken for ponies. Standing next to them they would be found to be sixteen hands high and over, and on the scales they would tilt the lever at from 1150 to 1250 pounds. Of their origin but little is known, but it is more than probable that the old Suffolk cart horse, imported into Massachusetts in 1821, the Cleveland bay, brought there in 1825, and the thoroughbred horses introduced in 1828, bred upon the best common mares of the country, have produced a class of horses, the lighter ones of which were driven to the stage coaches of thirty to fifty years ago, as they have seldom been driven in any other hill country. The heavier specimens of which furnished the best heavy team horses in the country, not excepting the Conestoga, a horse fully a hand higher, and admirable in every respect for heavy draft, as we used to see them, in the great six and seven horse teams coming from the mountains of Pensylvania through to New York. It is to be regretted that the furor over the Morgans since that time has caused the Vermont draft horse to become quite rare so that now it is rather difficult to find a good specimen of the breed as it once existed.

XV. The Canadian.

This horse, when pure, is entitled to be considered distinct. He can lay no claim, of course, to being regarded as the natural horse, no more than the Norman, Percheron or the English thorough-bred; but his characteristics are so marked as to render him worthy of being classed separately and noticed with some minuteness.

He is supposed to be descended from the Norman-French horse, brought over by the pioneers of Canada; but how crossed, (though he is evidently the result of a cross), it is impossible to say. In some particulars, he so much resembles the old horse of Normandy as to seem the unmistakable descendant of that stock; whereas in others he is so unlike him as to indicate that the cross must have been with a very strongly marked animal, of great powers of transmission.

The distinguishing characteristics may be stated as follows: The average height is about fourteen hands; the body is solid, compactly put together, but somewhat inclined to flatness of side; the head is rather large for a horse of the height stated, but it is well formed and lean, so that it does not appear out of proportion and cumbersome; the forehead is broad; the ears are wide apart, and carried well up; the eye is small and clear, and has a bold expression; the chest is broad and full; the shoulder is strong, but inclining to be straight and rather low and heavy at the withers; the loins are fine; the croup round and fleshy; the thighs muscular; the legs comparatively heavy and joints pretty large, but the bones are flat, and no race of horses has sounder and more powerful limbs; and none can equal the Canadian as to feet—these being tough, hard, iron-like, and free from disease, even under the most unfavorable circumstances. This seems to be one of his most valuable characteristics of body. Bad handling, awkward shoeing, hard travel—nothing in the bounds of reason seems to affect his feet. Diseases of this part are almost absolutely unknown.

The mane and tail are peculiar, being very heavy, and in almost all cases, wavy. The back sinews are shaggy-coated, nearly to the knee, and the fetlocks are long.

The prevailing color is black; but browns and chestnuts are frequently found; sometimes sorrels and duns, having manes and tails lighter than the body. Occasionally there may be found a dark iron-gray, with black legs.

Canadians are long-lived, easily-kept, and capable of the greatest endurance. They are heavy enough for the purposes of the farmer; and as roadsters, while they are not to be regarded as rapid travelers, they maintain a reasonable rate of speed, say six miles an hour, for long jour-

neys and continuously, and this while carrying a heavy weight. It is nothing uncommon for them to do fifty miles a day for many days in succession; and some have been known to do seventy, eighty, even ninety miles, at a single stretch of one day.

The breed is widely spread, but chiefly in a mixed state, (inferior to the true Canadian in almost every instance), in the Northern and Eastern States. Few horses are entitled to more consideration at the hands of those who would obtain the best medium-sized and easily-kept animals for the farm, and for medium heavy and moderately rapid draft.

XVI. The Connestoga.

A somewhat peculiar horse of all-work, said to have originated as a distinct stock in the valley of Connestoga. They are believed to be descended from Flemish and Danish cart-horses brought over by the early German settlers of this part of the country, with a probable admixture of the ordinary draft horse in common use in the German States at that day. There is, however, no record of the origin of the breed, and all speculation may be at fault. They resemble for the most part the Flemish horse, especially in color, all the prevailing Flemish colors except black being found among them in like proportion.

The Connestoga is a tall horse, often seventeen hands high; but his limbs are light for his height, and he is not inclined to be full of flesh, having a muscular rather than a fatty heaviness, so that he is very powerful in proportion to his weight. He is used chiefly for wagons, canal boats, and heavy carriages, for which purposes he is both strong and quick enough.

He is less distinct than formerly, and no pains are taken to preserve the breed as such.

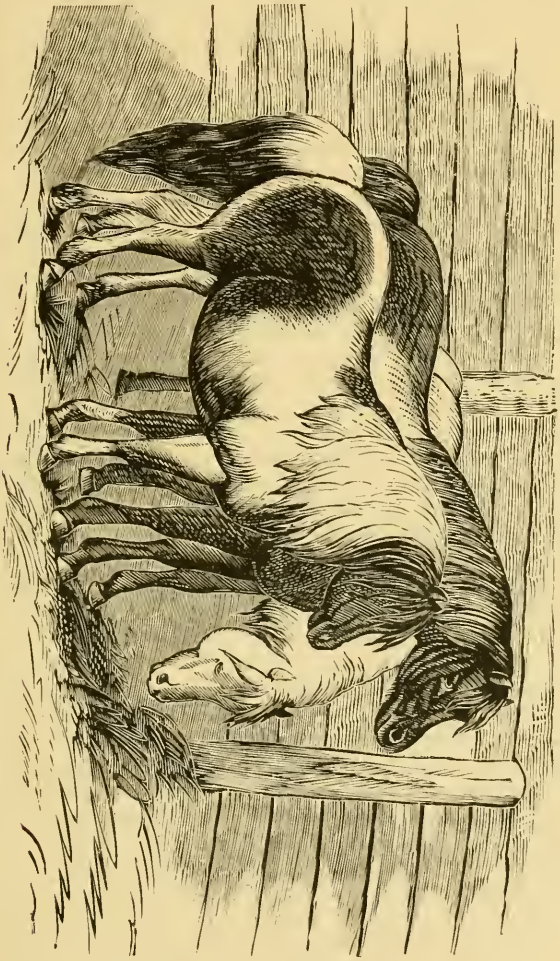
XVII. Ponies.

The small, or pony breeds, are numerous; but the only ones deserving special mention are the Shetlands, the Indian, and the Mexican Mustang. The former is the most distinct and best type of the ponies of the Old World, while the Indian and the Mustang are the chief, if not the only native kinds, known among us.

There are ponies somewhat similar to the Shetlands in the northern parts of Sweden and of Iceland, in Wales, and on the southwestern coast of England. All these little animals seem to have originated in latitudes to which the horse is not native, and to be dwarfed descendants of large and powerful progenitors.

Noticing first the *Shetlands*, those of most perfect form, though of

small size, are found in the extreme northern isles of Yell and Unst. In height, they do not average more than nine or ten hands; and many



SHETLAND PONIES.

are found that do no exceed seven and a half. It is held that no true Shetland can be so tall as eleven hands. In form they are round and

closely ribbed up; the head is well shaped — lean and bony, wide in the brow, sometimes slightly basin-faced, like the Arab; the ears are very small, well placed, are carried erect; the eyes are large and bright, with a fine look of intelligence; the neck is short and thick, and covered with a great mass of coarse mane; the shoulder is sloping, thick, and having little elevation at the withers; the loins are broad but finely formed; the quarters are well made, but not large in proportion to other parts; the back is gently curving, with never any tendency towards what is called sway-back; the legs and feet are of excellent shape, and of the most powerful texture, so that the Shetlander is a stranger to all those diseases of the feet and legs to which many horses are subject, and a lame Shetland is almost unknown; the tail, like the mane, is of great volume.

When roaming wild they live on the poorest fare, and are exposed to all the inclemencies of the seasons. When they cannot pick up their scanty subsistence upon the uplands, by reason of the snows of winter, they betake themselves to the sea shore and live upon kelp and sea weed. When taken by the peasants of those localities which they most inhabit, and reduced to subjection, they still require but little food and little care.

Their endurance is very great; and though they are of course incapable of great speed, they will carry weights largely disproportioned to their size, and keep up a uniform pace of from four to five miles an hour throughout the day, accomplishing forty, even fifty miles between morning and evening with apparent ease.

They are gentle, affectionate, easily trained, and as children's horses, and for all other purposes for which a pony can be at all serviceable, they are the best of all found in either hemisphere.

The prevailing colors are black, brown, and a dark sorrel.

The *Mexican Mustang*, one of the most widely known and distinct of American ponies, is found chiefly on the prairies of Texas and Mexico. His origin is doubtful; though it is affirmed that notwithstanding his diminutive size, and some striking points of degeneracy, there is clear indication of Spanish origin. It is difficult, however, to account for the difference between him and other wild horses, that discover in size as well as in general formation that they are the descendants of animals left or lost upon the American continent by the early Spanish discoverers and conquerors.

These ponies are undersized; of very slight limbs; often ugly and disproportionately made; with long neck, long back, and long, slender and weak posteriors. Their hoofs are often badly formed, tending to flatness and irregularity. Their heads, however, though long, are lean, well shaped, and wellset; and their nostrils are wide. Their manes and

tails are fine. They have some activity and spirit, and are sometimes vicious, but not difficult to subdue. In a wild state, they are easily outwinded by well-trained horses of the larger breeds; but domestication seems to have the effect of improving their powers of endurance, as they do good service for the Comanche Indians as a cavalry horse—carrying those warriors, and enabling them successfully to evade the pursuit of well-trained United States cavalry.

Almost every color is found among them.

The *Indian Pony*, another American, is thought to be a degenerated Norman—having sprung from horses of that stock brought to Canada by the first French emigrants, and allowed by some means to escape into the forests, as was the case with certain Andalusians farther south. Wandering, from generation to generation, in those cold regions, and under circumstances altogether unfavorable to the production of generous growth, they have become dwarfed and in other particulars modified as to form. They seem in their present state to be a perfectly distinct animal; and they possess many points of excellence. They are found in the upper Mississippi country, on the borders of Canada, and west of the great lakes, and are used chiefly by the different tribes of northern Indians. Great herds of them are found in a wild state on the northwestern prairies.

They are a larger animal than the Mustang, and in most respects far superior to him. Though he is to be considered a true pony, he is often thirteen, sometimes even fourteen, hands high. The body is very strongly built, being round-ribbed, short-barreled, and with powerful limbs. The neck is thick and short; the legs are covered with thick hair, and seem somewhat heavy and clumsy, but they are as firm, muscular, iron-like and sound, as those of the Shetlands. The mane is very heavy, often falling on both sides of the neck, while the forelocks cover the eyes, and give a sort of shaggy appearance about the upper portion of the head; the tail is also heavy and generally inclined to be wavy. They have a high crest, and quite a proud carriage of the head. They are docile, intelligent, sure-footed, capable of enduring all the rigors of a northern Winter, and able to perform long-continued journeys, at a moderate pace, while carrying or drawing disproportionate burdens.

Their courage is so high that they do not readily succumb to any hardship, however trying its nature, and though coupled with poorness and scantiness of fare.

CHAPTER V.

BREEDING AND RAISING

I. IMPORTANCE OF THE SUBJECT. —— II. THE BEST STOCK THE CHEAPEST. —— III. HEREDITARY TENDENCIES AND IMMATURITY TO BE GUARDED AGAINST. —— IV. PRINCIPLES OF TRANSMISSION.——V. THE TWO METHODS, "IN-AND-IN" AND "CROSS" BREEDING CONSIDERED.——VI. TREATMENT OF THE MARE AFTER BEING SERVED, DURING PREGNANCY, ETC.——VII. HOW TO KNOW WHETHER A MARE IS IN FOAL.——VIII. HOW TO KNOW TIME OF FOALING. —— IX. ABORTION, OR SLINKING THE FOAL. —— X. HOW TO RAISE COLTS.——XI. MULES.

I. Importance of the Subject.

No subject connected with the rearing and use of stock can be of more importance to the farmer and stock-grower, the intelligent, practical business man, than that of breeding. That it is every way more profitable to any one who rears and trains a single colt to have that colt of the very best rather than of any indifferent quality is almost too palpable to need a moment's consideration. That it is possible for every man of observation and good judgment to improve his stock is equally obvious. There is no line of work which horses are called upon to perform that has not its peculiar requirements, that can be better met by some specific kind of animal than by one chosen at haphazard. It is a matter, then, of the plainest common sense that every one who means to rear a horse for his own use should consider beforehand to what purposes he will most probably devote it. If it is designed for market, he needs no less to consult his interests by determining what markets are accessable to him, and what description of animal will be apt to find most ready sale therein, at most remunerative prices.

For the farmer who wants to breed and rear horses of all work, it would be manifestly foolish to seek a high-priced pure-blooded race, for his

mares, unless the mares themselves were of such type as to render it necessary to breed to high and elegant stallions in order to obtain those medium-sized, but compact, and moderately quick-paced animals that are so well adapted to all the wants of the farmer.

On the other hand, one wanting a light and fleet animal would set his inconsiderateness in a striking manner who should so disregard all the dictates of sound sense as to hope to succeed by any chance selection of either mares or stallions.

II. The Best Stock the Cheapest.

It may be laid down as the first rule—a foundation principle—that *the very best and purest stock that is really adapted to the end in view should be sought after.*

It costs even less to feed a horse of good blood and lineage than it does to maintain a scrub; it costs no more to shelter him; it costs less to groom him and keep him in condition than it does to keep the scrub from looking like a scare-crow; his movement is almost invariably smoother and steadier for the same rates of speed; his temper is generally better; his pluck and energy not less so; and if it is found necessary to put him upon the market, he brings a better price. The service of a stallion known to be of good, generous blood, and possessing adequate powers of transmission, must of course cost more; there must be a dam adapted to the obtaining of a foal of the best type possible from such a sire; but the penny-wise, pound-foolish policy of refusing to avail one's self of these advantages, when in the bounds of possibility, is too apparent.

Taking it for granted, then, that the best, in this case, is always the cheapest—that the finer and purer the horse can be, other things being equal, the more useful, more easily maintained, and more marketable he is bound to be, it remains to consider some points that must always be regarded by the intelligent breeder, who seeks wisely to adapt means to ends rather than to trust to chance.

III. Hereditary Tendencies and Immaturity to be Guarded Against.

A caution most needful to be insisted upon at the outset is that relating to the transmission of tendencies to disease and of actual disease itself. It seems that no man in his right senses, knowing the results to the human family when this consideration is disregarded, would think for a moment of utterly ignoring the possibilities of evil consequences; but ordinary observation leads to the disclosure of the fact that among horses diseases and impaired constitutional powers are often transmitted in this way. Mares at an advanced age, too stiff, too weak, too slow to

be of any further active use, are turned to account for breeding purposes —and the result is, a weak foal, lacking thrift and lacking spirit. Mares hacked about until they are ring-boned, spavined, and splinted, or perhaps dropsical or with a glanderous tendency,—no longer useful on the farm or on the road, are relieved from the work which they can no longer do with any chance of profit, and sent to the stallion. Result: a foal with a rickety or knotty osseous system, or with a tendency to some form of dropsy, or ready, in the presence of any exciting cause, to develop a case of glanders. And so of other disorders, more especially of roaring, thick-wind, blindness, contracted feet, grease, and affections of the brain and nervous system. Some mares have a peculiar predisposition to surfeit, some to swelled legs, some to vertigo, some to a sort of unaccountable viciousness. No wise breeder can afford to disregard these things. If he wishes to rear a horse for service, he wants a sound foal; for he knows he can get from such a one more work for less cost than from one unsound in bone, muscle, secretions or integument. If he designs to breed for market he is aware that neither a puny nor a diseased creature can be palmed off there either to his profit or his credit.

To insure healthy, active, thrifty progeny, then, the dam must be *sound and vigorous;* and this is no less true of the sire. We dwell less upon the latter because it is of far less frequent occurrence for a broken down and diseased stallion to be kept for the service of mares than for mares of this description to be put to breeding because they are known to be fit for nothing else, but are erroneously deemed useful for this. The condition of the stallion, however, must not be overlooked. Every breeder must have a care to choose a vigorous stallion, and one free from blemishes, mal-formation and hereditary taints.

Nor should mares be put to breeding too young. They should be full grown and vigorous, and when their powers begin to fail they should no longer be subjected to this service. It is the practice of some to begin to breed at two years of age. This is injurious to the mare, and otherwise unprofitable to the owner. The growth of the mare is hindered; her form is modified both by the weight of the stallion and by carrying the foal. And the foal itself is apt to lack fullness and power. Yet, it takes from the young mother that sustenance which she needs for her own development, so that she is dwarfed, while it grows up a more or less puny creature—of insufficient value to compensate for the injury done to the dam. No mare should be so used till she is at least three years old—four would be the better and more profitable age. It is said that mares which are allowed to mature, and are well treated afterwards, will not lose enough of their natural vigor to disqualify them for bringing forth good foals till after they are twenty years old; but it is idle to

expect good, strong, well-formed, thrifty, and spirited offspring from a mare that is either too young or too old; or that is subjected, even in maturity, to hard work, poor and insufficient food, and cruel handling.

IV. Principles of Transmission.

Let us next notice this principle, that *when the dam and the sire both possess a due amount of vigor, the foal will combine in itself the most marked characteristics of both; while any quality that is peculiar to either of them is apt to be prominent in the offspring.* This applies to both disposition and physical conformation.

It will be seen from this statement that no matter what the general line of policy to be pursued by the breeder, that of *in-and-in*, or that of *crossing*, he must select his stallions and mares with the view to having one supplement the other. If the mare is deficient in any point, the horse should be full or predominant there, and *vice versa;* and if any peculiar trait is desired, that should be very strongly developed in either sire or dam, while merely nominal in the other.

Another special point to be considered is this: that for the production of a full-formed, symmetrical, vigorous, and thrifty foal, *the mare should be proportionately larger than the horse.* An overgrown stallion, of great power, serving a mare of diminutive size, or of size somewhat less in proportion than his own, will beget her a strong embryo that will require more room and more nourishment than the mare can afford; and the result must be weakness, and, probably, deformity—almost inevitably diminutive size. Men's minds were particularly called to this fact in Great Britain when, during a course of years, the farmers of Yorkshire thought that by breeding their mares to the very largest stallions they could find, and without regard to the size of the mare, they could meet the demand in London for great overgrown horses, which it was then the fashion to drive in coaches and other heavy carriages. The result was a race of almost worthless creatures.

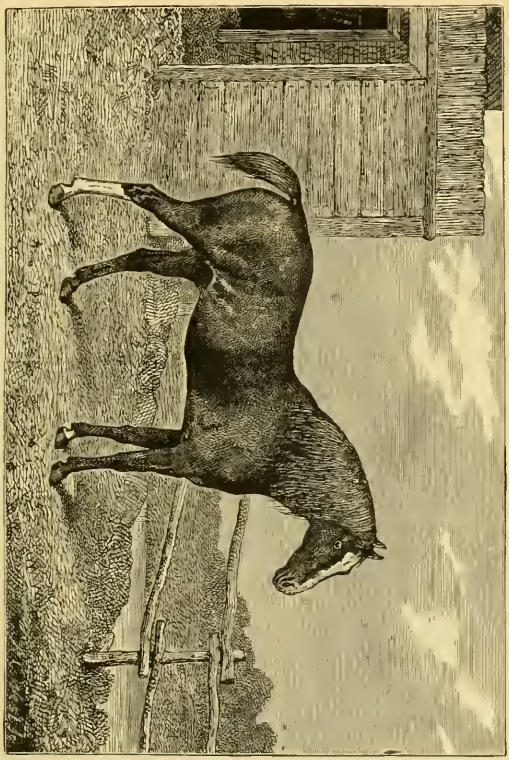
In other points than mere size, more depends upon the selection of the mare than that of the horse. The great majority are mares bred after their own stock unless the stallion is so powerful as to neutralize or overcome this physiological peculiarity; so that it is necessary for her to be of good lineage if the best results are wanted. If she has come from diseased, vicious, or in any way evil ancestry, though she may be free from perceptible taint, the bad points of her stock will very probably appear in her offspring. This principle makes it necessary to have a regard for her color and for the color that is known to have been prevalent in her line, since any dirty, vari-tinted, and otherwise disagreeable colors may appear in a foal of hers if her progenitors have had such a hue.

V. The two Methods, "In-and-in" and "Cross" Breeding Considered.

As for the two leading methods of breeding, circumstances generally determine which the farmer or other breeder on a moderate scale is to adopt. He is now almost always under the absolute necessity of crossing; and the main point with him is, *how* to cross, in order to secure the best results. The main directions are already laid down, with sufficient minuteness to enable anyone of ordinary intelligence to judge as to the best means. One point must not be overlooked, that really to improve the stock of horses as to blood—to obtain a strain that has the power of transmitting itself, and of so continuing in a steady line of improvement, recourse must be had to pure blooded horses. The English racer or thoroughbred is almost our sole reliance in this respect; although an Arab may occasionally be found. The true Norman Percheron is endowed with this characteristic of pure-blooded horses—he has great powers of impressing himself upon his offspring, and perpetuating the strain; but he is too heavy for the ordinary run of mares in this country; and if heavy draft stock rather than the lighter horse of all work is wanted, the Percheron mare should also be used—or some other of equal length and weight. Good mares of the common mixed breeds in the United States, bred to the light Arab, Barb, or thorough-bred stallions, will almost invariably produce foals partaking of their own size and strength, and of the finer forms, activity, and wind of the stallion. It is difficult to lay down any specific rule for crossing. The whole matter must be left to the good sense of the breeder, after the general statement of principles previously set forth. If the breeder has in view a mere racer, and is unable to obtain both thorough-bred mare and stallion, let him seek the racing stallion, at least, and one that will, as previously directed, supplement his mare—supply the points in which she is wanting for that specific purpose. If he wishes a trotter, the same care must be observed. As trotting horses are of late days in great demand in the United States, we insert here a cut of one of the most celebrated of the Old World trotters, the "Marshland Shales," a horse foaled in 1802, and which was known to old age as the very best in the British Isles. A careful study of his conformation will be of advantage to those who seek to learn the peculiar points of a horse of known excellence. He was a half-bred; and the impression long prevailed among the sporting men of England, (if it is even yet extinct), that no pure thorough-bred nor Arabian could excel as a trotter.

Now, let the reader compare him with "Dervish," and note the points of difference. "Dervish" was a little bay Arab, exceedingly fine, and remarkable for a *darting* or straight trot—throwing out his fore-leg and

straightening the knee before the foot touched the ground. He was sound, hardy, and a powerful foal-getter; and a cross with such a horse, upon any well-formed, large and reasonably long-bodied mare, would be



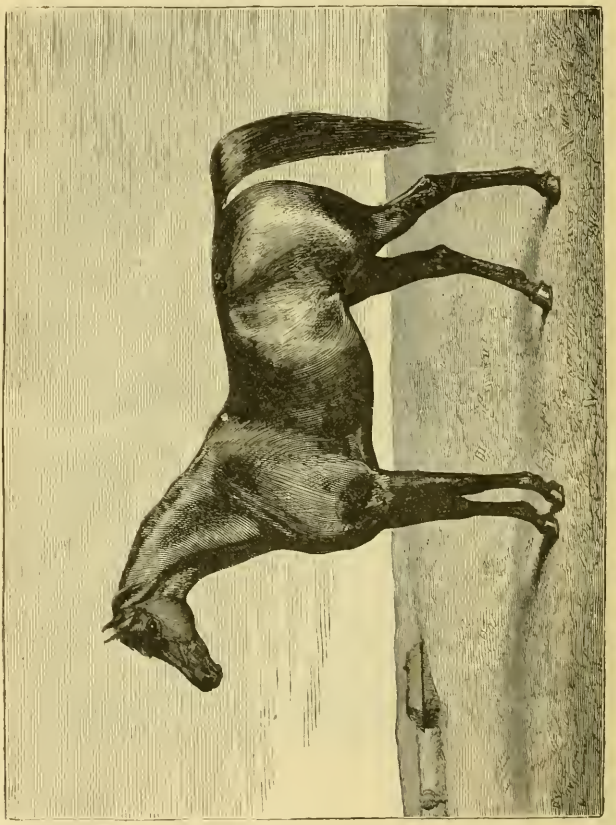
"SHAH."

apt to produce the beau ideal of a trotter—moderately large, long, yet compact, and with light and clean yet powerful limbs.

Notice particularly the cut representing "Gold Dust," a Kentucky horse, foaled near Lexington, the property of L. L. Dorsey, a few years prior to the civil war. He was mixed blooded, having been sired by

Vermont Morgan, a great trotter, while his dam had in her both Arabian and thorough-bred blood.

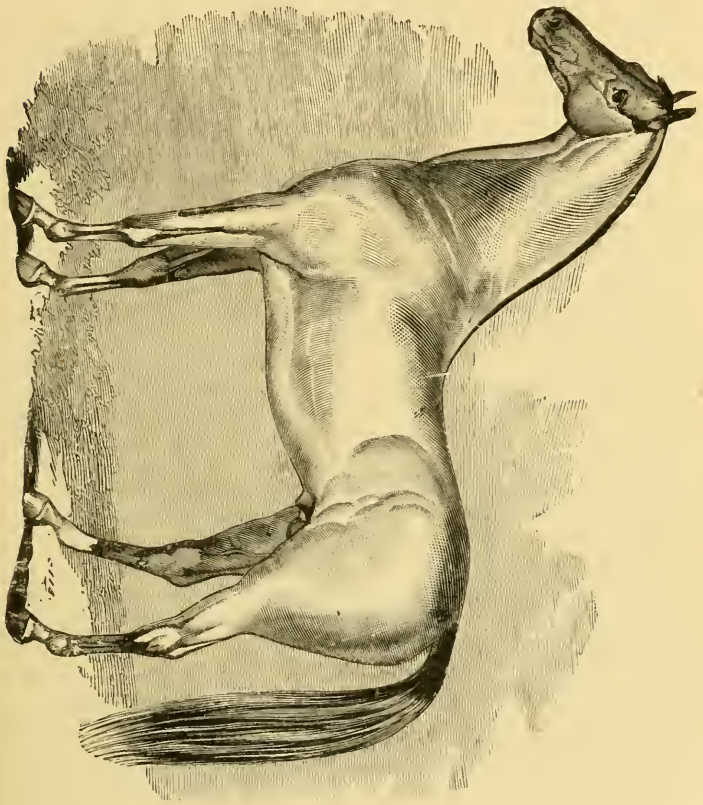
It is worthy of consideration on the part of the breeder that the colts of "Gold Dust" showed stronger marks of their Arabian and English



"DERVISH."

ancestry, which came by his dam's side, and remotely, than of the Morgan, his sire, so superior is the pure blooded horse as a transmitter of his own qualities, and an improver of breed. "Gold Dust" is worthy

of study. He was not only beautiful, but a horse of the finest action — a fast walker and famous as a trotter. When native American stallions such as he can be found, the owner of good mares need not repine if he finds it impossible to come at the much-to-be-desired pure blooded



"GOLD DUST."

foreigner. He may rest assured of getting improved colts, and of such character as will, if judiciously handled, perpetuate, to some extent at least, their own good qualities.

If it is heavy draft stock that is to be sought, the Norman Percheron

stallion, as we have previously intimated, ought to be had, provided the breeder has mares of such size as to render it judicious to put them to so large a horse; otherwise, the Norman Percheron mare may be most advantageously bred to some native stallion, say a Morgan, a good Canadian, or some other compactly built and quick-paced horse.

But it is unnecessary to extend these suggestions. If the breeder will consider with care what he really wants, and observe the points upon which we have touched, he will be at no loss to judge intelligently what course to pursue when cross-breeding is his only resource. He may often, of course, find it difficult to obtain just the stallion which his judgment tells him he should have for his class of mares; but this is a pointed argument in favor of that care which our farmers should long ago have exercised in this matter. Intelligent attention to the improvement of our stock throughout the Union will soon make it possible for them to *select* their stallions, rather than to be forced to take up with every hack that comes along with a flourish of red surcingles and a wonderful pedigree, manufactured to order.

As to in-and-in breeding, but little need be said. All the long-winded, voluminous, and learned discussions of the subject have resulted in adding but little more to our stock of knowledge than this: that too close in-and-in breeding is likely to bring about weakness, malformation, and general deterioration; but that to fix and preserve and intensify a certain strain, the Jew, (to speak in a figure), must not intermarry with the heathens round about him. In other words, to have true Morgans, both sire and dam must be of that stock, though of different families: to keep up the real Norman Percheron horse, we must have Norman Percherons, both male and female, to breed from: and so on.

The objection to close in-and-in breeding seems to be here: that nearness of kin is apt to be associated with likeness of qualities, both physical and mental, (if we may so speak of the horse): and thus the great requirement that one parent must supplement the other is not complied with. If there is a weak point in both, the weakness is perpetuated and made worse, whereas a weak point in one should be counteracted by a correspondingly strong point in the other. If it could be known with absolute certainty that two animals, close of kin, had strongly marked opposite traits of character, constitution and conformation, they might be bred to each other, and with the best of results. Such is sometimes the case; but it is not likely to be, and the rule should be as we have said—let the strain be the same, but the kinship as far removed as possible. This is believed by the most candid observers to be the secret of Arab success. The individual breeder knows not alone his own animals, but those of his tribe, and of other tribes as well. Moreover, the Arabs

are close observers and astute judges of horse flesh, and an intelligent son of the Desert could by no reasonable means be induced to breed his mare to a stallion in which his eye had marked some weakness or evil tendency which he knew the mare likewise to possess, however slight the indications might be in either.

Then, to recapitulate briefly: if the breeder has it in his power to keep up a certain stock, let him guard against the slightest admixture of heathen blood; and to be as sure as possible of no evil results, let him look to securing sires and dams as widely removed from kinship as possible; but he can never afford to disregard the point previously so much insisted upon, as a principle to be observed in crossing, that if either parent has a fault, the other must be correspondingly strong there.

VI. Treatment of the Mare After Being Served, During Pregnancy, etc.

It is proper next to notice some little matters of detail in connection with the management of brood mares.

Forty-four weeks is regarded as the time which a mare goes with foal; but this must be taken as mean time, since one occasionally brings forth a perfect colt four or five weeks sooner, and others will go equally as long beyond this period. When once the time of a mare is known, the breeder can generally regulate her going to the horse so as to have the colt appear at whatever season he considers most desirable, but without this knowledge he cannot.

After having been served by a horse, the mare should be allowed to stand idle awhile, as conception will be far more apt to take place if she is left to herself. If put to brisk motion, or to any strain immediately after copulation, she is apt to fail of conception. She should also be kept away from string-proud or badly castrated geldings, not only at this period, but during her entire pregnancy, as they are apt to worry her to the casting of the conception, or, at a later period, to slinking the foal.

After she has been allowed a reasonable season of quiet, moderate work will be rather beneficial than injurious; and this may be kept up until about the time of foaling. Special care should always be exercised to guard her against being kicked, heavily thrown, or inordinately strained in any way.

It sometimes occurs that at the time of foaling, a false presentation is made, producing difficulty of delivery; but no reliable instructions can be here given as to what course to pursue in these cases; and it is best to seek the aid of some skillful veterinary surgeon.

The mare which has had a colt will be found in season sometime within the next thirty days, and she ought to go to the horse at this time if she is to be bred at all. The ninth day after foaling will generally be found

to be the right time. Whenever indications of heat are discovered, the matter should not be delayed, as the season may pass off and not return. After putting, the days of trial are the ninth, then, if she refuses, the seventh after this, and upon a second refusal, the fifth after this, which is sufficient to prove her.

VII. How to Know Whether a Mare is in Foal.

It is often important for both breeders and traders to know whether a mare is really in foal; and one writer has published the following directions for determining this point, which he says may be implicitly relied on:

"After the first service of the horse, and before the next trial, on examining the vagina, or bearing, if conception has *not* taken place it will be of a fresh, bright, or florid and moist appearance, with a clear drop appearing at the lower part, and which, if touched, will incline to extend; but if conception is present, a different appearance of the surface of the vagina will be presented. It will be found dry, and of a dirty brown or rust color; and a dark, brown looking drop will replace the former clear drop. When these latter appearances are present, pregnancy may be regarded as certain."

VIII. How to Know Time of Foaling.

Two days, (in some mares only one), before foaling, a sort of sticky substance will be found protruding from each teat, somewhat resembling drops of milk. Care should now be taken to provide a suitable place for her, as this is a certain indication of near delivery. She should be removed from other animals, and a careful person should see to her often enough to guard against accidents.

Before the signs referred to, as shown by the teats, however, there is on each side of the spinal column, from the tail to the haunch, a furrow-like fold; and the bag will generally be found considerably increased in size. These signs show that delivery is not very remote, but cannot be relied on to denote the day.

IX. Abortion, or Slinking the Foal.

When about half the time of pregnancy is passed, more than ordinary pains should be taken with the mare, as it is at this time, if at all, that she is apt to slink. She ought now to have better feeding, and even gentler handling than she had previously; though at all times the owner but consults his own interests when he carefully guards her against ill usage. She has more need of food, and is less able, at this time, to endure hunger, as the rapid growth of the fœtus makes a constant and

severe draft upon her system. Want of care may cause abortion; and if a mare once casts her foal, she is apt to do so at a corresponding period of pregnancy afterwards,—more especially if like provocation occurs.

Various other causes of abortion, some of which may be briefly adverted to, for the purpose of pointing out certain preventive measures and suggesting others. Blows, strains, and any violent excitement may have this effect; and it is said that to allow a mare to see and smell food to which she has been accustomed, and of which she is fond, without suffering her to eat of it, will cause slinking. Feeding hogs or other stock upon corn, in sight of a mare that is not also thus fed, is, for this reason dangerous. Sympathy is a known cause: a pregnant mare, seeing another cast her foal, is apt to be affected in like manner. Nervous spasms, or a sort of animal hysteria, resulting from sympathy of the womb with a diseased stomach or other organ, occasionally results in causing the foal to be cast. Some affirm that a smell of blood, or of freshly slaughtered meat, will do it.

If a mare slinks because of a hurt, a strain, or some acute attack of disease, she is not apt to fall into the habit of abortion, provided proper care is taken to guard against exciting causes at a corresponding period of her next pregnancy.

When once this tendency is established, however, it is difficult to counteract it, as the slinking is more than likely to take place at times when the mare is not under observation. If symptoms of casting chance to be discovered in time, it may be prevented by promptly burning pigeon feathers, (or those of other birds, if these cannot be obtained), on a hot pan, or a pan of coals, and holding them so that she will be obliged to inhale the smoke.

X. How to Raise Colts.

If the colt is healthy and thriving, he should be weaned at from five to six months old. If allowed to run with the dam after this period, he is an unnecessary burden to her, since he has already learned to pick up and devote to his own use other sustenance, and he may most judiciously be taken away. If at this time the dam is still inclined to furnish milk so copiously as to render the udder painful to her, she should be looked after for a few days, to see that the over fullness does not result in inflammation and swelling. If necessary, draw away the milk by hand once a day for three days. It is a good plan to keep her at this time on dryer food than usual, and at more than ordinarily steady work. This course will tend to prevent the secretion of the usual quantity of milk, and the udder will soon be dry.

No matter how well born a colt may be he can never amount to anything if raised a starveling. If the dam is what she should be, he will have been furnished with abundant sustenance from the time of conception to that of delivery, which is one of the secrets of full-formed, finely-proportioned, vigorous foals. From foal-time to weaning he will have been kept vigorous and growing by the quantity and character of the milk furnished him, together with such little food as he has early learned to partake of at the manger and in the pasture of the dam. And now, upon being weaned, it is of the utmost importance that he have liberal food and sufficient protection from the inclemencies of the weather. This must be carefully attended to during the whole period of growth if he is expected to make any adequate return to the owner. Bruised oats and bran have been recommended as the very best food to be given for a considerable time after weaning. In any event let his food be supplied with regularity; and it must be nutritious, yet of such kind and so disposed as to be easily partaken.

He should not be stabled too much, nor in any other way too closely confined—being allowed all that range and exposure to out-door weather common to older stock in the more clement seasons; but he should never be left out in cool rains nor in the storms and biting cold of Winter. If a place is provided in which he may always shelter himself when the condition of the weather inclines him to seek cover, it will save trouble and yet insure a natural growth and that hardihood which comes of sufficient contact with cold and heat. For this purpose a straw rick is sometimes recommended—so constructed as to furnish shelter on the leeward side. This will give at the same time both bedding and a light species of food.

Provision must of course be made for his obtaining readily, and at such times as the wants of nature may dictate, plenty of pure water—the purer the better.

Thus much as to food, drink, and shelter. Another point of importance must not be omitted in his raising, that is, familiarizing him with his master or with whomsoever has charge of him. He should be handled sufficiently and in such a way as thoroughly to overcome all shyness, and to lead him to feel that man is his friend. This confidence once established, his training—when the proper time comes for that—will be easily and successfully accomplished; his subsequent relations with his master will be always pleasant, and his value thereby much enhanced.

XI. Mules.

The breeding and rearing of mules, so common in many portions of the United States, requires more than a passing consideration. To obtain the best results in crossing with the ass demands as much intelligent care as in the case of the horse: and the mule-breeder will find it much to his advantage thoroughly to inform himself as to how these results are to be obtained.

Many mistaken impressions prevail as to the relative usefulness of the mule, as compared with the cost of breeding and maintenance.

It is thought by the inexperienced that he is almost equally adapted to every kind of draft work to which the horse may be put; that his power as a pack-animal is much greater than that of the horse; that his endurance is greater; that he can subsist on less food; and that he demands every way less care. All these things are set down to his advantage; but in most instances the impressions are wholly erroneous. As a general thing, he is not well adapted to road or to city purposes at all. Especially are hard roads and pavements destructive to him if he is large of body and disproportionately small of leg. He is not so stout as a horse of proportionate size; he is utterly incapable of carrying so great burdens as some have represented, even if loaded and attended by experienced packers,—particularly if the journey is to be continuous and the roads are at all heavy; his powers of endurance are not greater than those of the hardier kinds of horses; he will consume as much food as a horse of proportionate size, if required to do like work and to maintain a like condition; and as to care, he can do without it—so can a horse—but both fail thereby of that eminent thriftiness, sprightliness and longevity which is to be expected of animals to which it is extended.

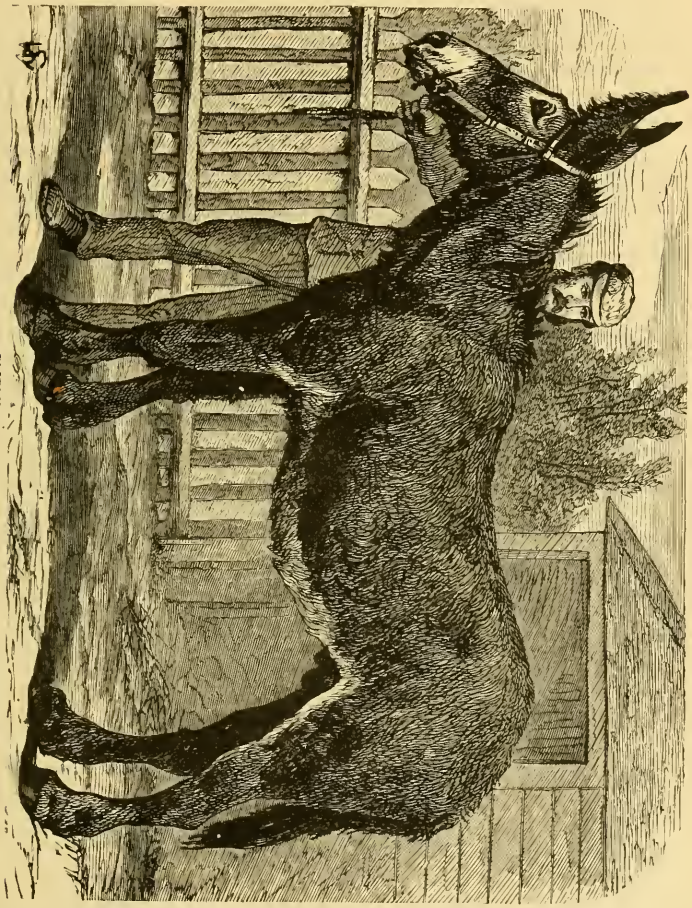
On the other hand, and to his discredit, it is commonly thought that he is naturally vicious, and wholly incapable of appreciating kindly treatment—that the only way to control him is by violence. Hence, those who handle him generally feel as though they are justifiable in whipping, beating, kicking and whatsoever other cruelties they may choose to inflict. This is a grievous, foolish and wicked mistake. The mule has one means of defense, and his heels are dangerous to those who wantonly provoke or startle him and place themselves in his way. His long ears are sensitive, and by roughly handling them his combativeness is easily aroused, and distrust is awakened to that degree that renders him almost unmanageable. Yet, the mule may be so raised and trained as to make him gentle, obedient, even affectionate and ready to follow his master like a dog—so trusty that only the one always necessary precaution need be observed in dealing with him—to keep out of the way of his heels, which

he throws out as instinctively when startled, irritated or approached by a stranger, as a cat thrusts out her claws. It has been remarked that "when a mule gets perfectly gentle, he is unfit for service;" and that, taken in connection with the prevailing method of training him, is doubtless true; but there is a better way, and, if followed, it would result as we have stated above.

Now, while the mule is not adapted to everything, and endowed with powers that are adequate to endure starvation and brutal treatment while in the performance of hard and faithful service, he is admirably calculated to meet many of the wants of individuals and corporations; and his breeding, rearing and training are matters for intelligent consideration. For supplying the army he cannot be replaced; for towing canal boats he answers admirably; for hauling cars inside of coal mines, he is indispensable; for the general knock-about work of a farm he is good in all temperate climates; and in a cotton and sugar country, where it is warm and sandy, he is most especially valuable. Though he cannot endure everything and still meet every requirement of a heartless task-master, he is yet gifted with a hardihood that is admirable, and recuperative powers that are astonishing. Seemingly half dead, utterly broken down and worthless, he will, with a little rest and care, soon be again ready for service.

In breeding for mules no less attention should be paid to the selection of suitable mares and a suitable jack than in the case of horses. It is folly to use old, worn-out, diseased, ill-formed, ill-conditioned mares, and yet hope to obtain a good foal. As a general thing a great, overgrown, long-legged mule is next to worthless. He is expensive to keep and unreliable as a worker—lacking wind, strength and nimbleness. The medium-sized, clean, compact mule is by all odds the best, unless a team can be found to combine more than the ordinary height with round bodies, not disposed to fleshiness, and larger, stronger legs than usual, with feet above the common size—which is seldom the case. The Spanish or Mexican mule—the offspring of stout, close-built, active Mustang or Mexican mares is superior in endurance to any known in the United States. He requires less food, takes it quicker, and is always in better fix for travel. If it is more profitable to raise good animals than poor ones, (and no man of ordinary intelligence can doubt this proposition), select mares for mule bearing that are sound, compactly built, and yet without any contractedness of body—active, strong, every way serviceable. Then, the choice of a suitable jack is important—doubly so from the fact that the great majority of mares breed after the jack in the matter of legs and feet, and, if it is a good and powerful jack, the foal will generally bear his marks, which is a matter of some importance,.

since mules so marked are always regarded by experienced stock men as being most hardy and valuable. The jack should be large—the larger the better, other things being equal, since it is impossible to find one so



POITOU ASS.

much surpassing in size the mares we have described as to render him objectionable on account of disproportion, as may easily be the case with

a horse. Most especially must the breeder have an eye to his legs and feet; for here, if at all, the mule is apt to be a failure—having a horse's body, ready to take on flesh beyond his requirements, mounted on legs that are too slight of bone and too small of muscle, with feet below the standard size for highest usefulness.

The cut on preceding page is a portrait of a large and powerful Poitou ass, an animal much valued in that district of France for breeding heavy draft mules from cart mares. The one here represented has been described as being fourteen and one-fourth hands high; greatest girth, seventy-seven inches; girth behind the shoulders, sixty-six inches; length of ear, fifteen inches; ears, tip to tip across, thirty-two inches; with hoofs much larger than those of the common ass. Compare him with the small, light ass, now in too common use among us. The difference seems to be almost one of kind; and with these representations in his mind, no observant stock-grower can be persuaded to put up with a poor pretense of a jack for the service of his mares.

As for the treatment of mares that are to be thus bred, no farther directions need be laid down, since it must be substantially the same as that prescribed for the breeding of horse foals. The like instructions relative to weaning, feeding, and sheltering the colt must also be carried out; and too much importance cannot be attached to beginning early the work of familiarizing him with man. He should be taught to regard his keepers without fear, to allow himself to be haltered, and readily to submit to direction and guidance. If this is done, he will be easily trained, when the proper time shall have arrived; and if properly handled and judiciously taught then, he will be not only a useful, but a trusty and agreeable animal.

CHAPTER VI.

HOW TO BREAK AND TRAIN A HORSE.

I. AMERICAN VS. ENGLISH FOALS.——II. AT WEANING TIME.—— III. THE FIRST LESSON.——IV. TRAINING.——V. TRAINING TO WORK.——VI. TRAINING TO BACK. —— VII. TRAINING TO SADDLE AND HARNESS. —— VIII. TO HANDLE A HORSE. —— IX. HOW TO HANDLE A VICIOUS COLT. —— X. SADDLING AND HARNESSING. —— XI. HOW TO SUBDUE A VICIOUS HORSE. —— XII. HOW TO TRAIN TO THE SADDLE. —— XIII. TRAINING TO TROT IN HARNESS.——XIV. HOW TO TRAIN TO TROT IN LIGHT HARNESS.——XV. HOW TO TRAIN FOR THE PLOW.——XVI. TRAINING TO THE WAGON.—— XVII. HOW TO TRAIN A RACER.——XVIII. TRAINING A STALLION

I. American vs. English Foals.

It is a common remark among Englishmen visiting America that our horses are more easily controlled and managed in the breaking in and training than English horses, and hence they have been led into the error of supposing that they were deficient in courage and spirit. Nothing could be farther from the fact. The true reason is, the growing foals in the United States are more the companions of the children of the farmer than in England. They are not as a rule, beaten and abused, and thus do not find their real powers of resistance as they do in England under the handling of hirelings of little intelligence, and almost no education. In the United States the fondling of the colts and fillies commences almost with birth. They are special pets of the boys of the family. On the farm, and even on the road, the mares are often regularly worked with the colts running at the feet, a very bad plan for the colts, and

especially so for the mares, but which, nevertheless, early accustoms the young animals to strange sights, while it renders them tame and confiding.

II. At Weaning Time.

The true education of the colt or filly should begin early; at weaning time. They should then be haltered and taught to lead, to stand quietly in the stall when tied. After this is thoroughly understood the colts may then have their liberty, for there is nothing more healthful, or better calculated to develop those powers necessary to the exhibition of speed, endurance, or great muscular exertion, than constant, every-day exercise, which all young animals naturally take in their play, and this often of the most violent character.

III. The First Lesson.

The first lesson the young foal should be taught is to come readily at call. This is easily accomplished by providing one's self with delicacies, such as sugar and salt, of which horses are especially fond. If there are a number of them they will all take the lessons together, and easier, for the most intelligent will assist the others. At the same time they must be taught to be quiet by a light tap of the whip to unruly ones.

In haltering, the colt or filly should be approached from the near side, the halter in both hands. Let the colt smell it until it no longer fears it, when, holding it properly in the left hand the right hand may be passed over the colt's neck and taking the strap of the halter it may be drawn on and buckled almost before the colt knows it. In case the colt should be wild, shy, or vicious, it must be confined in some place where the halter may be put on, but no haste must be manifested, until at the moment when it is to be buckled. Then do it quietly and quickly. If very strong, two ends of rope, each ten feet long, should be attached to the ring of the halter, and a free passage out of the stable allowed, one man holding each rope. In the case of a colt three or more years old, and strong, these ends should be twenty feet long, and the halter should have a cavesson so the muzzle will be pinched during violent struggles. The men holding the ropes—there may be one or more, according to the struggles of the animal—are not to seek to throw the colt or horse, but simply to restrain him in his struggles to escape. The yard should be soft so that if the colt falls it will not be injured. But if the animal does fall, when down it should be firmly held so for five minutes, or until resistance entirely ceases. As a rule, before the expiration of fifteen minutes, the colt will take a lick of salt from the hand and thereafter follow quietly. As soon as the colt gives up he should be led to the stable,

tied, given a little water and fed, and then be left to himself, being certain he can neither break the halter or injure himself. As before stated, the foal once haltered, taught to stand quietly, and to lead kindly it may then be given its liberty until of the proper age for training. The animal three years old and over once in hand should be thoroughly broken and made waywise without delay.

IV. Training.

The regular training of a colt or filly should begin at the age of two years past. There are many urgent reasons for this; first, the animal has neither the full strength, nor the disposition to resist, that it will have at a more mature age; second, it is more tractable, and will acquire its lessons more easily; third, it will not have contracted habits of self-will difficult to be broken off; and fourth, lessons in flexions of the body may be taught that will naturally increase its usefulness in whatever direction it may be wanted.

In the whole manner of breaking and training the trainer must not only understand himself, but the young horse as well and also as of special importance, the particular use for which the animal is intended. If the colt is of cold blood, that is of no particular breeding, it will not pay to spend much time on its education. It is simply to be taught to lead quietly, to stand still to be harnessed and unharnessed, to be accustomed to the ordinary sights and objects he will encounter, to work quietly at the plow, or other farm implements, and to the wagon on the road, and to stand quietly when tied on the public streets. If to be trained as a road horse, or as a saddle horse, or both, or as a hunting horse, a trotting horse, or a racer, all these will require special, and sometimes, long continued lessons according as the animal is intelligent and tractable or otherwise. It should always be remembered, however, that there is nothing gained by cruelty and abuse. A contrary animal may be punished, but it should always be done calmly and with judgment.

V. Training to Work.

The first lesson for any use is implicit and perfect obedience to the will of the master. This thoroughly accomplished the rest of the task is comparatively easy, it is only a question of time. It is supposed the animal is entirely free from acquired vice, that it has been halter broken, and taught to stand quietly at the end of the halter, to follow quietly, to lead by the side of the master, and to stand quietly in the stable.

The next step is to procure a bitting bridle, a strong bridle with a heavy smooth snaffle bit with a tongue piece and keys depending from the center

of the bit, it must also have a check rein that may be lengthened or shortened, and two side straps one on each side. The harness is simply a very wide strong surcingle, with padded back piece, having at the top a strap and buckle to form a loop for the check rein and also a buckle on each side of the surcingle in which to buckle to side straps. To the rear of the pad of the circingle is attached a back strap and round crupper strap, the latter to buckle and unbuckle.

Take the harness, and approaching the colt in the stall, let him smell it until satisfied, then put it on without undue haste or fuss. If the colt is nervous or skittish, talk to him and take time. The harness on, put on the bridle, giving plenty of length to the check rein and side straps, so the colt will not be unduly hampered, and let it out in a smooth, tight yard, following it about with the whip under the arm. Sometimes a strong colt will struggle and sweat violently, but if he has been properly handled heretofore, he will take the subjection pretty much as a matter of course. Let him exercise an hour a day for a few days, tightening the check rein and side straps gradually, until his head is brought into proper position, but not a constrained position. When he ceases to fret at the harness, pass the snap of a leading rope through the near ring of the bit and snap it into the off one. This rope should be about fifteen feet long. Taking the end in the hand, exercise the colt in a circle, allowing him to walk if he will. When somewhat tired let him stop and standing in front of him, say *come*, tapping him lightly on the fore-legs with the whip. If he pulls, hold him firmly, but without undue violence while he resists, tapping him on the fore-legs at intervals, using the word *come*. He will soon find the way to escape the whip to be to get near to you. Then fondle him and give him a trifle of sugar or salt and let him follow to the stable. So proceed from day to day, exercising him in a circle both to the right and left, (lunging it is called), gradually increasing his pace to a fair trot, until he will work as you want him, turning at the word to the right or left circle, or to stand and come to his master at the word of command.

VI. Learning to Back.

This is one of the most difficult things to teach a colt properly, and one most commonly slurred over. No horse is properly trained for the most simple use, until he will back as readily and as perfectly as he will go forward. It should be taught him while in the bitting harness, so that at the command to back he will do so to the extent of one or more steps. This is done first by standing in front of the colt and taking a rein in each hand; or take hold of the rings of the bits themselves. At

the word *back*, use pressure enough to curb the neck somewhat, but not enough to force the body in such a position as to cause the center of gravity of the animal to be strongly displaced. In backing, a hind leg should be lifted first, then a fore leg, and so on in rotation, the reverse as in walking. When the animal will back promptly and in line for ten or fifteen steps consecutively, the further lessons may be safely left until the time when the rider is in the saddle or in the vehicle behind the horses. Sometimes the motion may be made by standing at the side of the animal. However it is accomplished, if strong resistance is made the lesson must begin again and again until it is entirely comprehended and well executed. When so, a slice of sweet apple, carrot, a little sugar, or something the animal likes may be given it.

VII. Training to Saddle and Harness.

We have stated that the colt should be broken at two years old. At this age, however, it should never be put to hard labor. The work at two years old should be more in the nature of exercise than anything else, and this exercise should be to insure proper flexions of the body and limbs than for the amount of work the animal will accomplish, bearing in mind always, as before stated, what the animal is designed for. If as a saddle horse solely, or in connection with light driving, it is absolutely essential that the flexions should be thorough. The word flexion is but another name for rendering the head, neck, body and limbs perfectly supple. The animal must first have been rendered so quiet and obedient that he will not strongly resist the will and action of the trainer.

Put a bridle with a curb-bit on the colt, being careful to know that it fits and that there is space between the chain and jaw, so the finger can be easily slipped between. Standing in front of the horse, seize the right curb-rein with the right hand, about six inches from the branch of the bit, and the left rein with the left hand at about half the distance from the branch. Draw the right hand towards the body, pushing at the same time with the left, so as to turn the bit in the horse's mouth. If the horse backs, continue the operation until he yields. When the horse flexes his jaw and lowers his head, let the left hand slip along the rein to the same distance as the right, then drawing the two reins equally bring the head near the breast, and hold it there oblique and perpendicular, until it is sustained of itself. The horse will give notice by champing the bits.

The jaw is flexed to the left by a contrary move as given above. So the horse may be made to hold his head up, and perpendicular, to lower it, so the trainer can make the horse flex his neck to the right and left.

Standing at his shoulder, the trainer may make him move the hind-legs to one side or the other, the fore-legs remaining stationary, or to move the fore parts in a circle the hind-legs remaining intact, and this by means that will naturally suggest themselves.

But in all this there must be no ill temper displayed by the trainer no matter how bad the horse may act. Even if it be necessary to punish him the operator must be perfectly cool, never speaking in a loud voice or doing anything to cause undue resistance in the animal. The object is to teach the animal subjection to the will of man, and this can never be done by intemperate violence. Our practice has always been to break at two years old so the animal may become way-wise, flexible to the bit, to draw light loads, and under the saddle to walk, trot, or gallop, at command. Then at the age of three to four years, we let it again have its liberty. The reason of this is, at this age the colt is shedding some principal teeth, and therefore not fit for work. If the lessons have been carefully given they will never be forgotten. If however he be properly fed, in the stable, he may continue to do light work through his third and fourth year. In no case, however, should he be put to heavy draft until he is five years past. As a carriage horse, the animal should not have hard work until he is the same age. Then he will get better and better until eight years old, and often do good service at the age of fifteen to eighteen and sometimes when past twenty years of age. There are more horses ruined between the ages of four and five years than at any other age.

VIII. To Handle a Horse.

As we have stated, the foal should be handled as early as possible, and by different persons, to early accustom it to different sights and sounds, but always gently. It should be carefully brushed so as not to irritate it; its feet should be lifted and lightly tapped with a hammer; a head stall should be put on the foal having a ring but no strap, but so the strap may be attached at any time to lead and exercise it. Thus, the trainer beside it, the colt may be taught to walk, to trot, or stand still, allowing it to do pretty much as it likes, within bounds. Never beat it under any circumstances at this age. Reward it with a trifle of sugar, or a little bread, or a slice of carrot, and fondle it when it has done well. Remember the future horse is to be the servant of man for ten or fifteen years of his life, and that it will pay to take pains with the education of so noble an animal, if well bred. In this day and generation it is money thrown away to breed or handle any other, whatever the breed may be.

When the foal is six months old strap a pad to its back and attach stirrup

leathers so they may flap about. In the Spring following its birth put a colt's bit in his mouth, with keys attached. Rein him comfortably to the surcingle, to which a crupper must be attached. In this, however, everything must be easy to the animal. Don't try to get his *head up*. He may be flexed from time to time, that is taught to open his jaw to the left and right; to turn his head to the right and left shoulder; to raise and lower his head; to turn with his hind or his fore-feet in a circle, those not used being the pivot; to come to his trainer at the word: to back, to guide right or left by the rein; in fact at the age of two years he may be made pretty well waywise, so that when actually ridden, or hitched beside a steady horse, there will be little fear or resistance to combat. To get him used to the rattling of a wagon, tie him by a leading strap to the trace buckle of the back band to the off and also to the near horse in the team. This will instruct him and get him used to the word, and to walking and trotting quietly. All this may seem like taking a great deal of trouble, but remember that much of it may be done while doing the ordinary labor of the farm.

IX. How to Handle a Vicious Colt.

Suppose you come into possession of a wild colt at three or four years old, or one that has never been handled. Put him in a close place like a narrow stall, where he cannot turn round or by any means escape. Put on a cavesson halter (a cavesson is a nose-band) and it may end under the jaw in a running noose, so as to press with force when drawn tight. Have lunging straps attached to the halter ring and securely fastened. Allow the young horse free access out of the stable, being careful not to throw him down before he gets out. Let the yard be rather small, but quite tight, and with none near except his trainer and assistant, who holds the ropes. Thus with a strong man to each rope acting in concert the wildest colt may be handled without danger. Let him struggle and rear and plunge, the ropes being well spread to each side. If he rear, ease on the ropes so as not to throw him, checking him as he comes down again.

Only one person should speak, the trainer, using only the necessary words and those spoken in a firm but rather low tone of voice.

Have a good and reliable whip, a long, straight, flexible one, but not for use except in cases of an emergency; as in case the horse should get his liberty by slipping the halter and turn to fight. Then it must be used determinedly, but without exhibition of temper. If he rushes on you, a sharp, strong cut across the muzzle, avoiding the eyes, to be followed by others, as necessary. This will subdue him. If he kicks, a determined sharp cut over the hind legs next the body, will tame him.

A self-possessed man, understanding the use of the whip, is in but little danger from a young horse. But there is no need that the animal escape. The straps and leading ropes must be secure.

When the colt gives up, let the assistant hold the rope, while the trainer, with the whip under his arm, the butt forward, gently and gradually shortens his rope, advancing to the horse. Take plenty of time, speaking firmly but soothingly to the horse, watching for any indications of vice. If the ears are held naturally or thrown forward, all is right. When mischief is intended they will be thrown back. When the horse allows you to approach him and will smell the whip or your hand, give him a trifle of salt or sugar, rub his nose gently, and induce him to follow you. Then lead him into the stable and tie him in the stall securely. From this time on he should have a daily lesson until broken.

One thing must be remembered; in first tying up in the stable, the halter must be so strong that the animal cannot by any possible means break it, and so perfectly fitting and secure that he cannot slip or rub it off. Thus you will never again have to break him of pulling at the halter.

X. Saddling and Harnessing.

The training of the horse fairly commenced, it should proceed day by day. Get him used to the harness and saddle by putting them on every day. Do not throw them on. Buckle every strap as carefully as though the animal was to be taken to work. The saddle being allowed to be put on without restiveness, and kindly taken, gradually draw the girth tighter from day to day until sufficiently tight so it will not turn. Begin by bearing some weight upon it, first with the hand and then by pulling on the stirrup. If the colt cringes at first and leans over to the side pulled upon, it will soon get over it, and will at length allow the full weight of the man sitting upright upon the saddle in the stall.

Then accustom the colt to being touched in different parts of the body with the legs, to be squeezed somewhat with the thighs and knees, mounting and dismounting repeatedly. This being permitted, lead him out of the stable, and while an assistant holds him by the bridle above the bits —not by the reins—the trainer mounts, the assistant lets go, and in nine cases out of ten the horse will move off at the word of command. If he does not, use no haste: give him time. If he rears and plunges, the rider must have full command and confidence in himself, or else quietly dismount and use the previous course until the animal understands what is wanted. If the rider is master of the saddle, and the horse plunges or throws himself about, get him into motion in a field of not less than ten acres, and if rather soft, so much the better; circle him about the field

until he wishes to stop, and then force him forward until he is thoroughly tired and subdued. Ride him to the stable, gentle him, wash his mouth, let him take two or three swallows of water, add a taste of some food that he likes, and the real work of breaking is done. Thereafter it is simply a question of training.

When the horse is to be put to the wagon, know that the harness is strong, and that it fits perfectly and easily. If the colt has been tied beside another horse on the road, until he is not afraid of the wagon, so much the better. Hitch him beside an old, thoroughly broken horse, tying the doubletree back so the steady horse may pull all the load if necessary. Get quickly into the wagon while an assistant is attracting the attention of the colt by talking to him and stroking his nose; pick up the reins and bid them go. Keep the broken horse in a walk or slow trot, as the case may be, and the colt will generally take kindly to the work in less than five minutes. Drive for about half an hour, at a walking pace if possible, letting the colt have his own way if not too awkward and ugly, turning from right to left in rather long curves. When the colt shows signs of fatigue, and certainly before he is tired, but not until he has ceased resistance, drive to the stable and unharness carefully and quietly as before described.

XI. How to Subdue a Vicious Horse.

If he be a colt that has never been handled, the directions we have given for bitting and training will succeed. If he has been made tricky by a previous owner, who was timid, go into the stable when he is tied, watch him closely, but keep cool and show no signs of fear. Take him by the head, and speak to him in a firm voice, put on a strong bridle and curb, and order him to back. If he does not comply, give him a sharp cut on the fore-legs with the whip, and hold him firmly with the left hand, standing facing partly towards his rear, but with the head turned so you can see every movement of his eyes and ears. If the stall is not roomy and high do not attempt it. The struggle is better in a small close yard. If he rear cut him sharply again over the fore-legs while up, and if he kick cut him on the hind-legs near the body, but never more than one stroke at a time. When he ceases to resist, gentle him, and so proceed until the animal is entirely submissive to your will. If a horse has acquired vicious habits from having beaten a timid, or worse, brutal master, the case is more serious. Have nothing to do with him unless fully assured of your powers to subdue him.

To succeed he must be made to lie down; to do this confine him in a stall so close that he cannot turn round in it, and with the near side so

arranged that you can approach him sufficiently near to operate in any direction. If the horse will submit to fondling so much the better. Under no circumstances use a whip. The work must be done by showing the horse that his struggles are always against himself.

Have the side of the stall so arranged that it may be taken down and allow free egress to a yard thirty feet square, with a high board fence, or, better still, a large square barn floor covered a foot deep with straw tramped solid. Procure the following articles: a simple single-rein bridle, strong, and having a gag bit with large rings and long guards, the reins to be only sufficiently long so they will lie on the withers; have also a strong, padded surcingle, made with a two inch ring at the belly; also, one strap an inch and a quarter wide, and three feet or more in length, with a strong loop to form a slip noose, and a strong buckle on the end; and another strap five feet long with the end turned into a loop and firmly sewed; also two strong knee pads, to protect the knees in falling.

Put on the bridle, buckle on the knee pads, loop the short strap around the near fetlock of the fore-foot, raise the foot and buckle the end tightly around the arm of the fore-leg next the body, thus you have one foot firmly held up. Put the loop of the second or long strap about the fetlock of the off fore-leg, and pass the end of the strap through the ring of the surcingle under the horse. Do not be in a hurry, and in no case lose your temper. If it takes two hours, well and good, you have the horse then perfectly under command however vicious he may be.

See that there is entirely free egress out of the stable and let him go. Approach him slowly, but without hesitation, steadying him by the voice. If he show fight do not hesitate, he is on three legs and nearly powerless, except to bite, or to strike you in the act of rearing. Seize him by the near bridle rein about twelve inches from the bit, and placing yourself immediately at his near quarter, or just behind his shoulder, gather the long strap in the right hand and when the horse rears draw up the other leg.

If the horse struggles *let him do so.* It will not be necessary to exert much strength, simply tact and coolness in steering him. When he comes down it must necessarily be on his knees. If he continue to struggle let him exhaust himself. It will rarely take over five minutes, and never ten by the watch. Having him on his knees always seek to draw the head from you by pulling on the rein that comes over the neck. Once you have the head turned keep pulling on him until he gives up completely and lies down. Use no violence on the rein. It is only to be used to steer or guide the horse. It is the strap that does the work. However many attempts he may make to regain his liberty it will only end in the more complete discomfiture of the horse. Once down unless

he lies still hold his head still by sitting on it. When completely subdued, stroke his head, rub him on various parts of the body, soothe and caress him, and especially handle him wherever he is disposed to be touchy, being careful always to be on your guard, that if he resist he may be immediately checked.

Show him a buffalo robe, an umbrella, or anything he would be likely to frighten at, and *always* let him smell it until satisfied. Sit on his side, handle his feet, tap them, and at last remove the straps from his feet, and continue to fondle him. If he attempt to rise hold down his head firmly, and bend up one fore-leg. If he get the advantage do not struggle with him but let him rise to his feet again. Lay him down until he gives completely up. He will soon come to lie down quietly at the word, simply by tying up one foot, and at last will do so at your bidding without tying. When down and quiet pass your hand repeatedly over his body, breathe in his nostrils, gently open his mouth, give him soothing words, and when on his feet give him a taste of something he likes.

This is substantially Rarey's plan, and it may be practiced successfully on very vicious horses, as we have done. As a rule, however, the directions previously given will be found to be fully effectual in breaking colt

XII. How to Train to the Saddle.

No person should attempt to break a horse to the saddle unless he be a thorough horseman himself. It is not sufficient that he be able to stick on a horse's back with or without a saddle. He must be able to do so, and without aid from the bridle, when the horse is undergoing any of the movements likely to occur when on his feet. The bridle is used simply to steady a horse under certain circumstances, and as a signal to guide him. If the trainer be not able to ride thus, and with ease to himself and the horse, he has no business as a trainer.

Walking.—A fast walk is the most valuable of all the gaits of the horse. To walk rapidly is the first and most persistent of the lessons to be given. To teach a horse to walk fast the head must be kept moderately well up, and yet but little real weight should be borne on the bridle —only just enough to assist the swaying motion and nodding head always exhibited in fast walking. During the acquirement of this gait, no other should be allowed, and when the horse shows signs of fatigue, the lesson should end. In this, the seat of the rider is important, it should be easy and with sufficient grip of the limbs to steady the rider, and with play of the lower part of the legs to keep the horse well up to his work, and assist

in increasing the gait. Thus by care and practice almost any horse can be gotten up to four miles an hour and a really active one to five.

In breaking to walk fast to the wagon, there should be just sufficient bearing on the reins to steady the horse. The check-rein should be quite loose, for no horse can walk fast and easily with his head gagged back in an unnatural position. The horse, however, should be first trained to walk fast under the saddle, and by the means we have indicated. Then, when harnessed, he will not forget the lessons given, and may even be improved in his walk, if not already brought up to his maximum speed.

A naturally slow walking horse may be made to walk much faster; a fast walking horse may be greatly improved in his gait, but a lazy, slow dolt will never pay for any education beyond that of honestly pulling such a load as he may be able to comfortably move. For the saddle he is a nuisance, and no attempts whatever, should be made to bring him out as a riding horse. If a good one, however, bring out his walking powers. Like the trotter, he will improve until he is eight or ten years old.

How to Train to Trot.—Every farmer's boy thinks he knows how to drive a trotting horse to a wagon. Very few really do. Still fewer understand how to trot a horse under the saddle. If properly performed it is the least exhausting to the horse within the limit of his natural speed, and need not be unpleasant to the rider. That it is among the best and most pleasant exercise the horseman can take is without doubt.

Certain drivers have denied that the trot and the pace were natural to the horse. Every person who has been among the wild horses of the plains knows the contrary. It is a fact, however, that the trot is but a modification of the walk. There are two styles of motion for the rider; one the rising motion, by which the rider eases himself in the stirrups—not ungraceful when properly performed—the other where the rider keeps a close seat, supporting himself by the knees and stirrups. The elbows should be kept rather close to the side, and with only just enough bearing on the curb and snaffle to keep the horse's head correct and the animal under perfect command. In fact, under no circumstances is the rein and bit for any other use but to guide and steady the horse. The rider maintains his equilibrium, keeps his seat, and renders himself entirely at home in the saddle, through the science of equitation and the proper pressure of the limbs against the saddle. Until this is thoroughly accomplished, no person has any business trying to train a horse to saddle gaits. The rider must train himself first.

In the trot, when the rider rises in the stirrups, the snaffle-rein only should be used, a rein in each hand, and once grasped and properly arranged, the arms must be held rather close to the body, but without

clinging thereto. The feet should rest in the stirrup so the heel is well down, the leg from the knee down fully straight, and moving but little.

The rise and fall of the body must be as slight as possible, only sufficient to escape thumping, and to ease the horse. The head of the horse should be kept pretty well up, the limbs of the horse well under control. The rider will appear to support the horse with the bit. In fact, he does not. He simply holds the horse to his pace.

There is this difference between road riding and race riding: in riding for pleasure, the animal is never severely pushed, whatever the gait may be. In riding a trotting or running race, the animal must put forth all his powers, the only object being that he extend himself as much as possible, and without reference especially to the style of going. As a rule, race riders are disqualified for riding or trotting a horse gracefully on the road.

In trotting, always train the horse to slacken his pace and stop if desired, by slacking the rein, and at the word. In square trotting, the hoofs move in exact time, 1, 2, 3, 4. Some horses acquire a pace denoted by the time 1, 2. With this motion it is difficult to rise easily in the saddle, and it should not be allowed. To ease the horse's wind let him walk or canter slowly; or better, give him a jog trot. The jog trot, however, is under no circumstances to be allowed when traveling on the road in company. After a hard ride at any gait, it eases the tired horse immensely.

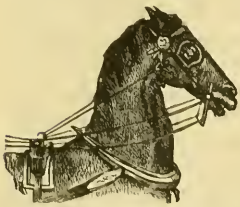
XIII. Training to Trot in Harness.

In trotting in harness the horse is more firmly held than when under the saddle, and for obvious reasons. Yet here a dead strong pull is to be avoided. The horse is simply to be supported and steadied by the bit. The driver must learn by his own study, and by observing others, how to do this. The bit must be adapted to the horse. A boring, hard mouthed brute could not be driven with comfort in a bit that would suit a sensitive mouth. Very many trotting drivers spoil their horses' mouths and make them pullers. The pull of a trotting horse should never be such as to tire the well trained muscles of the driver, even though it be a lady. Indeed, one of the best drivers we ever knew was a lady, and she was superior by the delicacy and yet firmness with which she handled the reins.

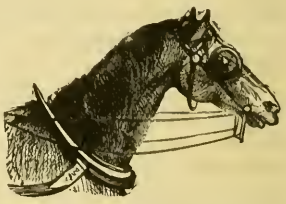
In training to trot in harness, the object should be to keep the horse squarely to his work, and at the top of his speed, without forcing him beyond it. In fact, no horse comes to his best trotting speed until he is at least eight years old.

Do not force him beyond his power, and above all do not rein him so

hard as to make him a borer. One of the best pair of road trotters we ever broke, were trained with curb bits, and when under smooth motion were apparently driven with a loose rein; such, however, was only apparent; they had been given such delicate mouths by careful driving that the least indication kept them in proper form. Below we give two illustrations: one showing a horse unduly checked and gagged back, the other with the head in an easy-going position. The use of the bearing rein is simply to keep the horse from getting his head too low, not to draw it back in an unnatural position. Under the saddle this is precisely the use of the curb.



HORSE'S HEAD WITH BEARING-REIN.



HORSE'S HEAD WITHOUT BEARING-REIN.

The Pacing Gait.—This is a gait natural to many horses, and exceedingly difficult to teach a horse that it is not natural to. On the other hand it is not difficult to make a trotter of a pacer. In pacing, a horse lifts both feet on a side simultaneously, and on perfectly smooth ground it may be made an exceedingly fast gait. It is easy to the rider but ungraceful in the extreme, from the fact that, as in sculling a boat, the body is swayed from side to side. If the horse has the pace naturally he should be trained to increase the pace by precisely the same general rules for increasing the trotting pace; by keeping him well in hand and inducing him by every possible means to increase his stride.

The rack, amble, and single foot, as it is sometimes called, are all but modifications of the pacing stride and the gallop, just as the jog-trot and the walk are modifications of the trot.

The amble is a slow, smooth gallop, or rather canter, and must be taught to the horse under the curb.

The rack is a modification of the pace, the feet instead of being lifted up simultaneously side by side, represented by the figures 1–2, may be represented by the figures 1–2, 3–4, that is, the feet are not lifted regularly as in the walk.

Single foot is a trained rack. It requires patience and time to teach, except in a horse having a natural adaptation thereto. Once the animal

catches the idea be sure to let him know that you appreciate it, and wish him to preserve it.

It is difficult to give written instrucitons, for rules which would accomplish the matter with one horse and rider, with another would totally fail. There is only this fixed rule: The horse must be in complete subjection to the will of the rider before anything but the natural gait is attempted. All these gaits, and the canter as well, are taught by using patience, keeping the feet of the animal well under him, and keeping him sufficiently well curbed so he cannot extend his stride until he fully understands what you want of him.

Changing the Leading Foot.—In developing any gait the horse should be made to start with either foot as desired. It should be one of the first lessons taught. To do this turn the horse's head somewhat by pulling the rein and pressing the heel slightly on the side opposite to the leg which it is desired to move. This will turn his head and croup slightly out of the proper line of progression, something that the horse naturally does when he starts. To change the leading leg, if, for instance, he is leading with the off fore-leg, rouse the horse, turn his head to the right, while the left heel reminds him to throw his croup out of line, upon which, by a peculiar motion the change is effected.

Galloping.—The gallop is often stated to be the fastest gait of the horse. This is however not strictly true. When a horse is going at the top of his speed under whip and spur, the whole animal is extended to the utmost, the head and tail straight out, and the animal going close to the ground. The slower he goes the more upright he holds himself, until when in the fashionable canter—the most distressing gait for the horse—he is almost on his haunches. All that is necessary to get the horse into the gait is to rouse him, give him a check for the leading foot, and restrain the gallop to the requirements of the case.

The hand gallop is an easy going pace, both for the horse and the rider, and may be said to be half speed. The gallop proper is such a gait as will exhaust the horse in going ten or twelve miles. Running is that gait which cannot be continued longer than from one to three miles without seriously distressing the horse. Being one of the natural gaits of the horse it is only necessary to rouse the lazy horse to the proper speed, or to check the ambitious one to the pace desired.

XIV. How to Train to Trot in Light Harness.

Trotting in light harness is generally considered to mean, being hitched to a light vehicle, either single or double and being driven for pleasure. Used in this manner horses may be driven either with the curb, the

snafile, or other trotting bit according to the delicacy of the hand of the driver, or mouth of the horse. We prefer, after they are way wise and used to the curb, to drive them thus, until they have acquired the proper carriage, and this entirely without the bearing rein. The object accomplished in this is, the horse becomes entirely subservient to the driver but at the same time learns to rely on himself so far as sure-footedness is concerned. When he will go in proper form he may be driven with a trotting bit, until he has learned to extend himself fully, when he may again be placed in the curb, and if delicately handled will give satisfaction any where on the road. Thus trained under the curb, when used with a trotting bit, they may be made to exhibit all the style they are capable of at an ordinary gait, and may be shaken up instantly for a brush and extend themselves to the utmost.

In trotting at any speed the horse must be trained to take hold of the bit, so he may be steadied by the rein. He must never be allowed to suppose that this hold of the bit is for the purpose of pulling on. It is to be used simply to steady himself, and as a means of quick comprehension of the driver's wishes.

XV. How to Train for the Plow.

In training a team for plowing, they must be made to walk at such a pace as will lay the best furrow, to walk evenly and straight ahead, without pulling apart or crowding each other, to obey the slightest check of the driver in laying out lands, and at the end of the furrow to come immediately and quickly about. To this end the reins should be carefully adjusted, the whiffle trees should be as light as will suffice to do the work, and the team must never be over driven. In stony or grubby land they must be kept so completely under control, as never to spring forward when the plow strikes an obstruction.

In turning quartering about at the end, on square lands, in plowing right handed furrows, the near horse should back slightly, that the off horse may not step on his feet, and the traces should be kept slack enough so the plowman may easily enter the point of the plow in the next furrow.

In back furrowing, the section of the circle described must be that which will bring the plow, with the aid of the plowman, most easily to the next furrow, the off horse in this case, keeping slightly behind.

In plowing there is nothing gained by hurrying a team, and then stopping to rest. Plowing is hard work because it is a constant strain on particular sets of muscles. The team, however, may be very much eased

by the tact of the plowman in holding his team up in plowing through hard or tough places, by knowing that the harness fits perfectly, and by always having his plow clean and in a condition to scour.

In laying out land the team should be rather wider apart than when plowing furrow after furrow, or so the plowman may see the line stakes between the horses. In laying out lands always have the reins of such length that they may be carried over the left hand plow handle. Thus by taking the right hand rein a little beyond the center the hand may easily grasp the handle. A pull directly back will carry the horses *gee* and carrying the hand forward will tighten the near rein and carry the horses *haw*, while a steady bearing will keep the team in a direct line ahead.

The only position for the reins if carried otherwise than on the handle is to carry them just above the hips, and of such a length that when the team is going at ease they will be loose, and yet may be easily tightened by the plowman walking a little farther in the rear than usual. With a hard-mouthed team "feeling their oats" this will do. By the means we have indicated, if the lines are nicely adjusted, the team may be made to pull on the plow, and once used to this way of driving we have never known of its being abandoned, except for a time as a change. The practice of carrying a rein in each hand adopted by some good plowmen is not to be commended, except with a kind team. In this case to carry them over the left handle is easier, whether the team be wild or gentle. In any case the reins should never be carried over the neck. It is awkward, and the team is never under control. Carried over one shoulder and under one arm is an improvement upon this awkward plan.

XVI. Training to the Wagon.

But little need be said on this score if attention has been paid to what has been said previously. Upon good roads and with an ordinary load the team should be kept up to their maximum gait in walking. When the road is good in some places and bad in others, as country roads usually are, the load must be such as the team can move by hard pulling in the worst places. After a heavy pull always give the team a breathing spell, and in the middle of a pull if the team can start the load once stopped. This any honest team will do unless the bottom is miry, that is, unless from standing the team and wheels sink deeper and deeper. In this case, the only way is to keep going until firm ground is reached. The average driver is sure to hurry his team in the mud. They should be taught to pull steadily and slowly, and when started again, after rest-

ing, to take hold of the load steadily and with a growing impulse until it moves.

XVII. How to Train a Racer.

The training of racing stock, whether for running or trotting, is a fine art, and one which it would take a volume to properly describe in print. There are certain essentials, however, which are easily understood, and which every one who breeds stock for speed should know. The colt having been taught to gallop easily and naturally, should be put upon good sound oats and the cleanest hay. He should be carefully blanketed and groomed and his legs hand rubbed until fine. The exercise should be daily, upon a good course, and ridden under the direction of a horseman who is thoroughly up in his business. When this cannot be, the work must be done under the instruction of the master.

In race riding, the jockey throws about all his weight in the stirrups, steadying himself with the knees and thighs. The seat of the body is carried well back, the loin slightly arched, so the weight will not be brought too far forward, as the breech would be if the rider should stand straight in the stirrups. A jockey of ordinary weight will be found to carry his leg, from the knee, slightly thrown back; thus by stiffening his knee he can change his center of gravity without ceasing to stand in the stirrups.

Very light jockeys ride with longer stirrups, throwing their weight principally on their thighs, and with their breech raised entirely from the saddle, thus giving them a strong hold on the horse. Standing in the stirrup, however, cannot be long endured, and is only used for fast racing or galloping over bad ground, rough or deep, or in the case of a hill that must be passed quickly over.

Training to racing speed on the farm may be summed up as follows: a smooth track, regular feeding four times a day with the soundest of oats and hay, with a bran mash often enough to keep the bowels in regular condition; the most careful grooming, with plenty of hand rubbing of the legs; sweating exercise every day, and thorough cleaning afterwards; a trial gallop to extend the limbs, with an occasional spurt to note the increase of speed, and occasionally a fair trial at the distance which the horse is trained, to test his speed, powers of endurance, improvement, and capabilities.

XVIII. Training a Stallion.

The training of a stallion should commence from the time that it is intended to keep him as such, and certainly from the age of one year,

when colts are usually gelded. He should be exercised in a close yard, first at the end of the halter, and at length without bridle or halter rein, and made to advance, to back, to circle, to describe a figure eight, to rear and come down at the word of command, to kneel, to sit on his haunches, to lie down, and especially to come instantly to his keeper at the word of command.

All this takes time, but is labor well spent, for henceforth his usefulness as a sire, and escapes from accidents by being kicked, may depend upon his thorough training. Any observing person will have noted that in fully half the cases a stallion will be found dragging his keeper about like a puppet. All this may be avoided by proper care and training, so the horse will retain his full exhuberance of spirit, and yet be entirely under control.

His care and keeping should be of the best possible, and his daily exercise enough to keep his muscles firm, certainly not less than eight miles a day during the season of service. However well trained the stallion, when it comes to actual service, there is always a time when he may refuse to obey. Then he must be made to do so at whatever cost, and to accomplish the object, the whip must be used to any extent sufficient to conquer him. Cut sharp and strong, but with temperate judgment. Do not rain a succession of blows. This will only make him fight. A few well-directed blows will generally suffice, if they are sharp and cutting. Do not be afraid of drawing blood. If it can be done at the first stroke, so much the better. Give him time to think before you strike the second time. Give him the order you wish him to execute. If there is the least hesitation, strike again, and so on until he is conquered. If he has been properly trained previously, he will handle nearly as easy as a gelding. If not, he may become a brute, dangerous for any man to handle. Above all, a stallion once trained, never intrust him to an incompetent keeper, and never allow a valuable one to be ridden during the season of hard service. If he travels from one station to another, or is otherwise exercised, it should be with a leading rein, the rider being on another horse.

CHAPTER VII.

HOW TO SHELTER.

I. COMFORTABLE SHELTER ECONOMICAL.——II. CONSIDERATION IN CONSTRUCTING STABLES. III. MANGERS AND RACKS.——IV. HOW TO INSURE A GOOD TEMPERATURE.——V. CLEANING THE STABLES.——VI. THE LOFT.——VII. THE HARNESS ROOM.——VIII. THE OUT SHED.——IX. WATER.

I. Comfortable Shelter Economical.

Although the horse is found wherever civilized man has made his home, and has been subjected by barbarian tribes wherever subsistence may be found Summer and Winter, yet in a wild state he is only found where the Winter and the Summer climate is mild enough to furnish herbage the year round. While it is true that the horse will stand weather as inclement as cattle, yet the owner who subjects either horses or cattle to the storms of Winter, not only makes no money from them, but deserves to lose them entirely. Thus the humane man always consults his best interests when he keeps his horse stock not only well fed but comfortably housed.

II. Considerations in Constructing Stables.

The first consideration in the construction of a stable is the number of horses to be kept. After this comes in economy of space in connection with convenience, ventilation in connection with the health of the horses,

and lastly the cost. In the construction of stables the question of warmth, convenience and ventilation are the prime integers, and whatever the character of the structure it must combine these three essentials, else it is a failure.

In the construction of stables the horse and carriage floor, including harness and tool room, and the loft, in which should be situated the bins for oats, shelled corn, corn in the ear, meal and bran, with suitable spouts and slides for delivering the feed on the lower floor, are all that is necessary. Every stable, however, should be supplied with a ventilating pipe placed about midway over one of the centre stalls. If there are more than four horses kept there should be two, and one in addition for each other four, but all connecting with the principal air shaft at the peak of the roof.

Where the horses are near the ground, and especially if the first story, or the walls of the whole building be of brick, there should be at least two courses above the ground laid in water-lime, to prevent the dampness from the ground ascending up the walls by capillary attraction. However the foundation be laid there must be perfect drainage, either natural or artifical, under the stable. Many valuable horses have been lost through inattention to this simple matter.

The size of the stable must of course correspond to the number of horses to be kept, and the number of vehicles to be sheltered. The width of the stalls should not be less than five feet each—six is better—and there should be at least one loose box in every stable, however small. If there are a number of breeding mares there should be one loose box to each four horses. These boxes should not be less than ten by twelve feet. Fourteen feet in depth for the stall is little enough. The travis or partition between stalls should not be less than six feet six inches long. If the stable is fourteen feet deep seven feet is better. It should be seven feet high at the head and five feet at the rear part.

III. Mangers and Racks.

The mangers and racks should be of the most substantial character, and, if expense is no object, of enameled iron, as to the mangers, and of iron as to the racks. If made of wood, oak or elm is a good material. However made there should be no rough edges to annoy the horses, nor splinters to wound. The top of the cap should not be less than three feet three inches from the floor, nor more than three feet six inches. The manger to be about thirteen inches wide at the top, nine inches at the bottom and eleven inches deep. The caps may be four inches deep and three inches wide, securely placed. The sides and bottom of the

manger may be of inch oak, or other hard wood. If made of pine they should be of inch and a half thickness.

IV. How to Insure a Good Temperature.

If the stable be of brick or stone, it may or may not be lined with wood with an air space between. If of wood, there should always be a lining, and the sheathing upon which the weather boarding is nailed should be covered with tarred paper. Ventilation must be attended to; this is best secured by orifices at proper distances next the ceiling, that may be opened or closed at pleasure, and provided with lattice work to throw the air up when opened. This with the doors and windows in Summer will give plenty of ventilation and in Winter the ventilators alone will suffice. It is one of the most essential points in building a stable in our American climate, with torrid Summers and Arctic Winters, that no expense be spared to make the buildings comfortable. We are decidedly in favor of a vestibule, large enough to hold a harnessed team, or if preferred, if the carriage room be large enough and separated by a close partition from the stable, as it should be, this may be made to do. From this the entrance to the stable may be a sliding door, through which to lead the horses; the object being to prevent the rush of cold air into the stable chilling every horse in it.

Where more than five horses are kept in a stable we advise a close partition between each four stalls and their accompanying loose box. The reason is, that in each compartment an equal temperature is retained. It is not so much the degree of cold that affects horses, as sudden changes of temperature. Thus each may have its separate ventilation and air shaft, and conduce very much to the comfort of the animals kept therein.

V. Cleaning the Stable.

Cleanliness in the stable is of the utmost importance. There should be sufficient bedding under the horses at all times to insure cleanliness; all damp portions together with the droppings should be removed twice a day. We have never found a better nor more economical way than to use a wheel barrow, with sides sufficiently wide and flaring to hold the load a man may handle, in which the manure and damp bedding could be thrown and wheeled on planks immediately to the pile. Where it is thrown out of windows it often heats so as to be offensive in Summer, and in Winter these windows, besides often allowing the wind and storm to beat in, are objectionable in many ways.

VI. The Loft.

We have already advised that the granary be in the loft, the shoots, however, should not enter the stable; first, because they create more or less dust, and second, they are liable to contract more or less effluvia from the stable. They should communicate with a room by itself, sufficiently large for sifting oats and mixing feed. The granary must also be made rat proof, which is best done by covering the bottom and two feet of the sides, and the top with sheet iron. The floor of the whole loft should also be covered with a tight floor of planks, plowed and grooved, so that by no possibility dust or trash can drop through; the loft should also be high enough to hold straw for bedding, and hay enough for at least two months' feed. In fact, if it be a farm barn, it were better to hold enough, if possible, for the Winter. This might detract somewhat from the architectural appearance of the building, unless the storage and stable room be large below. In any event we should not build any stable, however small, less than eight feet high, with a loft above of the same height, and in the case of a large building we should extend the loft to ten, twelve or fourteen feet as the size of the ground floor might allow.

VII. The Harness Room.

The harness room should be as complete as possible with suitable pegs for harness and seats or frames for saddles. It should also be provided with a saddler's horse for sewing straps, awls, needles, wax, thread, etc.; also a table for oiling harness, and if it have a boiler set in a stove for heating water, it will often be called in requisition in Winter, not only for its hot water facilities, but for drying harness and saddles as well.

VIII. The Out Shed.

If the stable is provided with an out-shed for cleaning horses when the weather is not inclement, it will be found to save much dust and dirt inside. If this shed be a vestibule to the stable, with sliding windows, so much the better. It may even be used, in case of need, for temporary stables or for baiting a double team when it is not considered necessary to unharness. In fact there are many uses to which it may be put aside from the protection it would give the stable, in opening the doors in cold and inclement weather.

The Surroundings.

Every stable should have a smooth, close yard, with a tight high fence

surrounding it, and if one side can be covered with a shed roof, fourteen feet wide, so much the better. This yard should be about 30 or 40 feet wide, and if it contains a place in the center of strong posts for a man to take shelter in from a vicious brute, it is not amiss. We once saw a life saved in this way, from an ugly bull, which broke from his fastenings and would have killed his keeper but for this safeguard. There should also be a grass lot near for cutting forage in Summer for soiling, and for turning in a sick horse occasionally.

IX. Water.

The water supply is important. If taken from a well and pump it is absolutely essential that there be no contamination from the drainage of the stables and yards. If a tank can be so arranged that it will not freeze, build one by all means, and connect by pipes, pumping the water by means of a windmill. Or the tank may be situated where it will supply the house, and a pipe laid to the stable underground, ending in a penstock. In this case, the windmill and tank may be entirely isolated from the barn or house, and the water carried for any distance, provided the head is higher than the outflow.

CHAPTER VIII.

HOW TO FEED, WATER AND GROOM.

I. LAYING THE FOUNDATION. —II. WHAT TO FEED. — III. WHEN TO FEED. — IV. WATERING. — V. KINDS AND QUANTITIES OF FOOD TO BE GIVEN. — VI. HOW TO PREPARE THE FOOD. — VII. HOW TO MAKE MASHES, GRUELS AND HAY-TEA. — VIII. THE VALUE OF HAY AND STRAW.— IX. FEEDING GRAIN. — X. STABLE CARE AND GROOMING. — XI. THE TIME TO CLEAN. — XII. CARE OF THE FEET. — XIII. BLANKETING WHEN NECESSARY.—PROPER TOOLS FOR THE STABLE.

I. Laying the Foundation.

The feeding of horses must be either simple or complex according to the circumstances under which they are placed and the nature of the work required of them. It would, for instance, be as foolish with the farm or ordinary work horse to pamper with fire-warmed stables, highly stimulating food, and exquisite grooming, together with all the paraphernalia of blankets, hoods, bandages for the legs, and necessities of the trotting or racing stable, as it would be to allow this latter class to receive only the same care and attention usually bestowed upon the team kept solely for the plow and other drudgery of the farm. At the same time the extremes to which horses are subject, either on the farm or in racing stables, might well be modified in very many cases to the health and well

being either of the farm horse or the pampered and high-bred racer. That is to say, racers are often "drawn down" too fine, and the ordinary work horse too often suffers from neglect. Thus in the first class we see a number of diseases seldom shown in the stables of horses with sufficient care, while the stables of horses carefully kept seldom suffer with the class of diseases found when horses are allowed to go dirty from day to day, and often from week to week.

To commence at the beginning, the breeder who would succeed with any class of horses, should see that the mare, while carrying the foal, has sufficient food and shelter, and that the foal itself is sufficiently nourished during the period of growth. Nothing is gained by insufficient shelter and food, whatever the use for which the animal is intended, and this brings us to the question of the food itself.

II. What to Feed.

In the West the feed of all horses of whatever class is oats, Indian corn, bran and hay. Whatever the work to be done, bran should always be kept, since a horse being off his feed, or slightly ailing from any cause not indicative of violent disease, bran mashes with good nursing will bring him out all right in nine cases out of ten. So, in the Winter when horses are confined to hard food, a bran-mash once a week should be given, and this generally on Sunday morning. On the farm there is nothing better than an occasional feed of roots—carrots, Swedish turnips, or mangel wurtzel—being valuable in the order named. If a peck of these could be given daily as an evening or noonday meal, the good effects of this feeding would be quickly shown. For the mares before foaling time, for the farm or draft horse, for the carriage horses of the citizen, and even for the fast driven roadster, or racer, when not being driven to exhaustive work, these will be found valuable.

The foal itself should be learned to eat roots as quickly as possible, and if the mare takes kindly to them it will not be a difficult matter for the foal to learn to eat them. As to the other food of the young colt or filly, oats alone with grass or hay, according to the season, should be allowed. In the Winter, half oats and half corn may be given with benefit, unless the young things are intended for racing or trotting, and are kept in warm stables; then Indian corn would not be desirable, as being too heating under the circumstances.

For the ordinary farm team, or other horses of slow work, Indian corn may be the main dependence in Winter, in connection with good hay; especially so if a few roots can be allowed as a portion of the daily provender. For fast working horses, sound oats and hay will be the

principal dependence, but in the Winter we have always given one-third of the weight of the daily grain ration in Indian corn, and we have always thought, with decided benefit.

III. When to Feed.

The importance of strict regularity in feeding is underestimated by nine-tenths of the ordinary feeders, and by fully one-half of the stablemen having the care of well bred horses. The horse, for whatever purpose he is used, if actively employed, should not get less than three feeds a day, besides the hay he eats during the night. All fast working horses should have four feeds a day. The hours of feeding are of prime importance. These should be, as closely as possible, at six in the morning, at noon, and at six at night, except at those pressing seasons of extra labor, when the morning feed may be an hour earlier and the evening feed an hour later. In this case, however, nose-bags should be carried to the field, or they should be turned to the wagon at 10 A. M. and at 4 P. M. to take one-third their usual allowance, as given morning and evening, which meals, as a rule, should be rather more than the noonday feed. When corn is the main dependence as feed these lunches should be of oats, and if bruised so much the better.

Fast working horses should receive their food four times a day, at six in the morning, at ten, at two, and at nine at night. Carriage horses should be fed the same number of times, the first feed being at six, and the last after their real work for the day is done, say at nine at night, since simply going to some place of amusement at eleven o'clock or later can hardly be called work. The mid-morning and afternoon meals will depend upon the hours at which they are generally used, nine A. M. and 1 P. M. being the usual times for feeding.

IV. Watering.

Watering and the water used is of fully as much importance as the feeding. A horse is particular as to the water he drinks, but yet may be accustomed to any water without detriment if it be fit for human use. The water of large lakes, rivers and running brooks is best and in the order named. That of ponds without outlet or inlet the worst; in fact pond water should never be used; well water is altogether better and may be given without fear, when used constantly, but as with man, the horse accustomed to lake or river water, which is always partially soft, should be given well water, when necessity requires, with care and only in small quantities, the change being gradually made. Water should always be

offered before feeding, and never given in large drafts immediately after feeding; two to four quarts may be given with benefit immediately after dry feed, to properly moisten the stomach, and it may be freely given in two or three hours after feeding. When driving, water should be offered, especially in hot weather, at every stop, but only a few quarts should be taken at a time, for a heated horse, like a heated man, will take more than is good for him. Upon stopping, wash the horse's mouth with a sponge soaked in water, and let him swallow each time two or three light sips, just enough to moisten the throat, and upon starting give him four to six quarts each as the occasion seems to demand. Under no circumstances allow a heated horse to drink heartily. Farm teams and slow draft horses, at ordinary labor, may be allowed what they will naturally drink, but when heated the same rule must be observed as with hard driven horses. With these simple rules kept in view any intelligent owner or driver may keep his team fresh and without danger.

V. Kinds and Quantities of Food to be Given.

We have already spoken of the proper food to be given under ordinary circumstances; they are sound, whole grain, and bright, clean hay. Certain classes of horses, as omnibus horses, stage horses, car horses, and the draft horses of large mercantile firms in cities, are generally fed ground feed and cut hay. When the hours of feeding and rest may be estimated with accuracy, this is on the whole as conducive to the health of the animal as may be, when the economy of such feeding is considered, especially when we remember that in large cities a regular veterinary surgeon is employed, who visits the stables regularly to look after the well-being of the horses, and also where the superintendents and foremen are supposed to be experts.

On the farm, and in the stables of road-driving horsemen, and where carriage horses are kept, cut feed may very properly and economically form from one-third to one-half of the daily food given. When only one feed is given it should be in the morning; when two are given, they should be the morning and evening feeds.

As to the quantity to be given, no definite rule can be laid down. The horse must have a quantity fully sufficient to keep him well up to his work. Hard working horses may, if regularly fed, have what grain and hay they will eat clean, and in this case there is no better judge than the animal itself, except in the case of ravenous gluttons, sometimes found among horses as in the human family. Elaborate rules have been laid down by theorists, including a per cent. of grain according to the weight of the animal. In practice they will not work, since the labor, condition

of the animal, temperature of the season, and of stables must be considered. In the large omnibus stables where all the work is to be got out of horses that they can endure, from ten to fourteen pounds of cut hay per day are given, with from eighteen to twenty pounds of corn meal. Mix into provender, and on it they will go from eighteen to twenty miles each day. With this about three pounds of salt may be allowed each month. Some stable men do not feed more than one pound, arguing that a large quantity produces profuse staling; others feed up to four. In times of extra severe labor the cornmeal is increased by about three pounds. It would be better if the three pounds of meal where omitted and one extra feed of six quarts of whole oats be substituted, and given daily. The average livery horse may be kept in good condition on twelve pounds of hay and eight pounds of cornmeal daily, to be given at two feeds with the addition of six quarts of oats at noon, eight pounds of hay to be fed cut, with the meal, and four pounds from the manger. This same feed would do for ordinary farm horses at usual work, or if the grain is fed whole, five quarts of shelled corn, or its equivalent in ears, and six quarts of oats, with what hay will be eaten should keep the animal in working condition.

VI. How to Prepare the Food.

In preparing chopped feed, half the hay to be used, or clean, bright, long straw cut into about three-quarters to one inch lengths, should be put into the mixing trough half an hour before it is to be mixed, and thoroughly moistened. On this throw the meal, mill-feed, or whatever article is to be used, and moisten it. Then cover with sufficient hay to make the mess for the desired number of horses, weighing both hay and meal. Let it stand until feeding time, when the whole should be worked over and over until thoroughly mixed. . If salt is given with the mess, put in the required quantity for each horse, from one-quarter to half an ounce per horse each feed. Many stablemen mix the mess half a day in advance, but this we do not like. Horses, like men, like their food fresh. An iron box is best for mixing, and it should be thoroughly cleaned after each meal.

VII. How to Make Mashes, Gruel and Hay-tea.

The ordinary sweet mash, as usually made, is to take four quarts of good bran, moisten it gradually with hot water, and then mix with what boiling water will bring it up to the proper consistency for eating, covering it with a cloth and feeding either warm if the animal will eat it so,

or else cold. What salt will lie on a quarter dollar may or may not be mixed with it.

A better mash, especially for dry fed horses, is to boil two quarts of oats and a pint of linseed, for each horse, for about three hours, and then mix with it sufficient bran to bring it to a proper consistency. Cover with a cloth and feed cold. Such a mash given once a week, if the horses are on average feed, will keep their bowels in condition. If off their feed, add a little salt and a half pint of molasses.

Gruel is one of the best possible things for a beaten out horse. Stir gradually in a gallon of water, a pint or a quart of oat-meal, or half flour and half corn-meal, according as the horse likes it thick or thin, and fill up the pail with cold water. If the horse hesitates about drinking it, give him first a mouthful of water. If he be very tired a quart of sound ale will do him good, but under *no circumstances*, when exhausted, should he be given a feed either of grain or hay. If the horse will take nothing else, turn down a bottle of sound ale, rub him until dry and refreshed, and then feed.

Hay tea is also a good stimulant. To make it—fill a bucket three-quarters full of bright, clean hay, pour over it enough boiling water to fill the pail, and cover tight, to keep in the steam. Press the hay down occasionally, let it stand fifteen minutes, turn off, and add water enough to make a bucket three-quarters full. Give to the horse when the liquid is cool enough to drink.

VIII. The Value of Hay and Straw.

In the feeding of horses the principal use of hay is to distend the stomach. For this reason lean horses, and those just off the pasture on coarse feed, require more than those which are regularly stabled and groomed. The change to grain must not be too sudden, else indigestion is apt to set in. Once a horse is used to full rations of grain, if oats are used, or corn meal and bran, he may get along daily with from six to eight pounds of hay a day. The hay, however, must be of the very best, bright, clean and free from dust. There is no economy in feeding bad hay. It is the cause of heaves, broken wind and other diseases produced by indigestion. Good clean straw is altogether better than poor hay. Straw is altogether the best material for bedding, and should always be used when it can be had. In the West it is plenty, and yet not one farmer in ten uses it for bedding in sufficient quantity or renews it often enough.

IX. Feeding Grain.

The most economical way of feeding grain on the farm is in its whole state. Oats and corn should be shaken in a sieve with a mesh so small that it will not go through, all dust and light matter blown away, and all stones, bits of iron or wire, carefully picked out. It will pay the farmer to do this as well as any other stable man. In feeding corn allow one-half the measure of shelled corn that would be deemed sufficient of oats, since corn weighs about double that of oats. If corn in the ear is fed, one-third more by measure heaped should be allowed than when shelled grain is used. In other words the stable must use seventy pounds of ear corn when fifty-six of shelled corn would be given, or 112 pounds of oats.

Some horses eat their grain better for being moistened. If so, moisten it, but as a rule we like to feed whole grain dry, since the horse is obliged to grind it better to get it in condition for swallowing. Horses with bad teeth always bolt their food whole. All such horses, and also aged ones, should be fed cut hay and ground feed.

X. Stable Care and Training.

The importance of steadiness and care in the management of the stable and in the cleaning of horses cannot be over-estimated. A brutal stable-man, or one which a horse fears, should be immediately discharged. There is indeed now and then a horse that requires to be kept in terror. These of course are exceptions. The competent stable-man should use neither fear nor brutality. Not half the so-called strappers (cleaners) are fit to be about a horse.

Many stable-men imagine the curry comb is an instrument for cleaning the legs and body of the horse. It is an instrument for cleaning the brush and for loosening the scurf on the fleshy — not bony — parts of the body. In using the curry comb, do so lightly, carrying it in circles rather than in straight lines. Use a wisp of hay for rubbing the dust from the legs, and a corn cob for the fetlocks, finishing with the brush. In brushing, do so thoroughly, with firm, long strokes, where possible, being careful in working about the head and bony parts. Clean the brush often by passing it over the teeth of the curry comb. When the scurf and dust are thoroughly cleaned out, go over the horse with a damp wisp of hay, and finish with dry cloths, being particular to get any particles of dirt out of the fetlocks, the ears, about the head, next the tail, below the thighs, under the jaws, and between the fore-legs. A horse

thus cleaned, whether he belongs to the farm or the city stable will not occasion shame on the part of the owner.

It is a question among horsemen, whether when a team comes in wet and muddy at night, it is proper to wash them. We have never found advantage in so doing. Clothe them warmly, bandage the legs loosely, and when dry, clean them, at least so far as removing the dirt, and getting up a glow at the surface is concerned. Thus handled, horses will seldom be found liable to surfeit, scratches, grease, and other diseases induced by checking the natural perspiration.

XI. The Time to Clean.

Clean when the horse is dirty. Always once a day when the horse is kept in the stable. Horses that run in the fields in Summer, or in the shed yard in Winter require no cleaning. Nature provides a natural scurf that defends them from the changes of the weather. Before work horses are littered down for the night they should be again thoroughly cleaned if necessary. As, for instance, if the animal has been on the road or in the field; it is important and will lighten the morning cleaning, apart from real necessity of the case.

Whenever the horse comes into the stable from the plow or wagon, for the day, he should be thoroughly cleaned *when dry enough*, and if sweating or otherwise wet should be thoroughly scraped at once. The scraper is a thin, flexible piece of wood; a section of barrel hoop makes a good one. In any event a horse once in the stable, clean him thoroughly, unless he be taken out again after being "baited." If he remain in the stable long enough for the operation, clean him especially as to the limbs, and if there is time, as to the body. It may seem like a good deal of work, but it will pay.

XII. Care of the Feet.

The feet are half the horse, in fact a horse with bad feet, is as near a worthless animal as possible. Attention to the feet is therefore of the first importance. In this connection shoeing is to be attended to. Know that the blacksmith understands his business. There are as many ignorant botch-workmen in cities as in the country. The horse's foot should be a study, and every horseman should understand the anatomy of the foot; this will be given in its proper place. How to *care* for the feet is in place here. When the horse is brought in from work, each foot should be lifted, cleaned, and examined with the picker to see that no gravel or other hard substance has found lodgment between the shoe and hoof, or

about the frog. Examine the frog to see that no substance is wedged therein, and that no nail or other sharp object has pierced the sole. If the hoofs are inclined to be hard and dry, fill them with a mixture of cow-dung and clay, or with oakum saturated with tar and petroleum. Watch them for contraction of the hoof, caused by allowing the shoe to remain on too long, or from bad shoeing. If the frog gets torn and ragged, cut the ragged edges but leave the frog intact. If the hoof be found pierced with a nail, and you are not perfectly sure you have pulled out every bit, cut it out at whatever labor it may be to you, or pain to the animal. Then dress the wound with a pledget of tow saturated with tar. If the hoofs are inclined to be hard and brittle, oil them occasionally, or let the horse stand, say for an hour or two, or for a half day on Sunday, in a box of soft clay and cow-manure, coming prettywell up the hoofs. Thus by the exercise of care and judgment you may keep the feet, what they ought to be, the better part of the horse.

XIII. Blanketing—When Neccssary.

A blanket is always necessary when the horse is standing in the stable in Winter. A light sheet is about as necessary in Summer, during fly time. A blanket should always be thrown over the horse in cold weather, or even in the cool weather of Spring and Autumn, when standing after being driven. A horse should always be blanketed when standing in a draft, or in the rain, using a cloth or rubber blanket as the case may be.

In blanketing a horse, see that the blanket is sufficiently large to cover the animal from the neck to the tail, see also that the breast flaps are sufficient to protect this sensitive part, and that the blanket is large enough to cover the sides and flank fully. If not, do not buy it at any price. Buy a blanket for each horse, and having them use them when necessary, buckling them on so they will stay. Very many stable-men have a number of blankets for each horse ; this is well enough if they can afford it, but one blanket to each horse, with enough in reserve so a dry blanket may be had as occasion requires, and with a good surcingle to each blanket, is all that is really necessary.

XIV. Proper Tools for the Stable.

The tools necessary for cleaning a horse properly may be very few or many. As a rule any horse may be properly cleaned with a scraper, a curry comb, a brush, a sponge, a comb, a wisp of straw, and a rubbing cloth. Horse pails both for washing the horse and for watering are indispensable to any stable but never use one for the other. These should

be of oak, half an inch thick, and with strong iron bails, and to hold fourteen quarts. The set of cleaning tools should be provided for every two horses. Every stable should have two manure forks, one of steel and one of wood, splint broom, a scoop shovel, and a wheel-barrow. With these any stable may be kept clean, and if the eye of the master is kept on the help, the horses will not suffer for want of care. And these essentials to a stable, and the treatment suggested, are urged on the score of economy. They *pay*. We also urge them from humane considerations, and those of neatness and system. In all respects kindness and attention to a horse are both satisfactory and remunerative.

CHAPTER IX.

BENEFITS OF KIND AND CAREFUL TREATMENT.

I. ABUSING A FAITHFUL SERVANT.——II. WHAT ARE BARBARITIES.——III. A PICTURE FROM LIFE.——IV. THE OTHER SIDE.——V. A GOOD FARMER'S SURROUNDINGS.——VI. FARMER UNTHRIFT'S BARN. —— VII. HIS HOME. —— VIII. THE CAREFUL MAN'S THEORY. —— IX. USING THE MEANS WE HAVE.——X. AN INFALLIBLE RULE.

I. Abusing a Faithful Servant.

The horse is the most useful servant of man, as he is one of the most noble of animals. He is fortunate if he falls into the hands of a kind and considerate master. Fully one-half of the horses used in civilized countries are driven by persons brutal in their temper and instincts, who, coming into possession of a horse suffering from disability, inflicted by some former owner, or perhaps reduced in value by age, are sold for a song, and thereafter the poor tortured brutes wear out a most miserable existence, until at length they drop in their tracks, literally driven to death. This picture is not overdrawn. Go into any of our cities, and on to many of the farms of the land, and see animals in every stage of incurable disorders. On farms horses disabled for city use in the possession of some renter, whose only aim seems to be to see how soon and on how little food he can wear out the miserable animal. Contrast these with the horses that are carefully fed and cared for, and by actual count the result will be surprising even to a veterinarian.

As a rule, the horses of the better class of farmers fare the best. They are not pampered, it is true, neither are they overdriven or overworked. If they remain on the farm, they are capable of full work until they are

twenty years old. How many arrive at this age? Not one in fifty. The most of them die under seven years of age.

II. What Are Barbarities.

Their name is legion. It is barbarous to overload or overdrive animals; to give them insufficient food and water; to allow them to stand

THE TEAM OF THE CRUEL AND IMPROVIDENT MASTER, AND THE USUAL SURROUNDINGS.

day after day uncleaned and in filth, denying them even the poor boon of cleaning themselves; to work them during the progress of spavin or ringbone, navicular disease, with corns, gravel, or other painful ailments of

the foot; to let them stand shivering in the cold, or in apologies for stables, in inclement weather without blankets; to drive them in the mud and mire and neglect to clean them; to ride them under torturing saddles, or to drive them in galling collars and harness; to use badly fitting

THE TEAM OF THE KIND AND CAREFUL MASTER, AND THE NATURAL SURROUNDINGS.

or torturing bits, and then jerk their tender mouths because their agony will not allow them to carry their heads directly in line or go straight ahead: to ride or drive through deep mud at a pace which quickly exhausts the animal, and then beat with a loaded whip, because they flag, or spur them until their sides are a gore of blood; to keep the poor

creatures in terror, from fear of the whip, and then beat with renewed vigor because the innocent brute does not comprehend what the master really does not know himself; to give the faithful servant over to the tender mercies of some man who calls himself a blacksmith, who either pricks him with a nail, pares down the hoof and the frog to the quick, and then because the poor animal cringes, holds back or perhaps stumbles, beats him for it. Such are a few of the more common of the cruelties inflicted, and which may be seen day by day by any who will notice. A man cannot pass along the streets in any large city, on any day, without seeing some of these things.

The observing man need not travel far in the country to see some such picture as we present of the farmer who believes in letting his stock shift for themselves when not at work, and is careful not to over-feed when they struggle with the plow or wagon.

III. A Picture from Life.

But, say some readers, the picture on page 122 is a fancy sketch. Not at all. It is drawn from life. The superannuated, rat-tailed horse, with one ear gone, blind, spavined, ill kept and ill fed; the mule, still more rat-tailed than the horse, intact only as to his ears, the broken-down fence, the edge of the marshy pond, serving as a wallowing place for hogs, and as a watering place for the family and stock; the dilapidated stable; the log cabin—all are true to life. There is but one redeeming feature in the whole scene: the wife begging that a little land may be left in front of the house unplowed. Will it be granted? Not so. The ragged edged plow will cut as close to the corner of the cabin as possible, and then bear off in a circle in the near distance beyond. Land is too valuable to spare any next the house, but the weeds and dilapidated fence tell a tale of plenty of land beyond. If the traveler chose he might learn the cause of all this. A history made in the corner grocery of the village, over the broken bridge.

Contrast this with the companion picture we give on page 123, and which tells a very different tale.

IV. The Other Side.

It is of the farmer who is well-to-do by his own tact and energy. His team is trained to almost human intelligence. Strong, able horses, whose dams were kindly worked and carefully fed. When foals they were early taught to take their oats. In Winter they were carefully housed, their training commencing within a few days of their birth; broken in at two

years old, worked gently, and at three past given full liberty again until four. They are now six years old, trained to go without lines, a gray and a bay; well bred; weighing 1250 each; capable of going a mile in four minutes to the farm wagon. How much think you they are worth? Let us whisper it; $800 has been refused. A foolish farmer is he not, to keep so much money in a *farm team?* Perhaps not. He asks $1200, and he will get it. He has fulfilled the conditions we have given as to breeding, feeding, watering, care, shelter, breaking and training. They have lacked for nothing he could give them, and in turn refuse nothing they may be able to do for him.

V. A Good Farmer's Surroundings.

The surroundings of a man in any condition in life, whether he be rich or poor, are an index to his character. The animus of all men is to make money, but some possess in connection, a love of the beautiful. Without method in labor no man can be successful. The farmer who has method, and an eye for the beautiful, and only comfortably well off, perhaps, will show his barn yards and surroundings something like the following illustration:

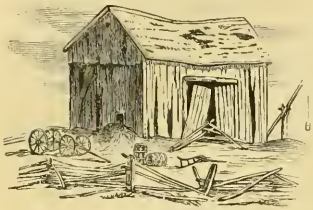
THE BARN OF THE PROVIDENT MASTER.

His barns are tight and ample, and filled to the ridge-pole with fodder. His yards are protected with shelter-belts and wind-breaks, his pastures and meadows ample and luxuriant, and his crops well tilled and heavy. Inside his barns will be found a place for everything and everything in its place.

VI. Farmer Unthrift's Barn.

On the other hand we give a view of the barn of the improvident master. His well, simply a hole in the ground where the drainage of the yard may enter, the roof of the hovel rent and torn, the delapidated doors propped

up with rails, the weather-boards fallen or falling off, and the whole thing shaky, like the master's mind. Fine stock, fat, and well groomed, have come out of hovels of barns; they were made warm and comfortable. It is not the most expensive structures that always contain the best stock, but in the end the better barn will be built. We have never seen good stock issue from such a barn as we have shown, and it only needs to show the house the farmer lives in, with its brush heap, its line of ragged clothes, the ragged, dirty children, and generally dilapidated appearance, to complete the pictorial story of general unthrift.



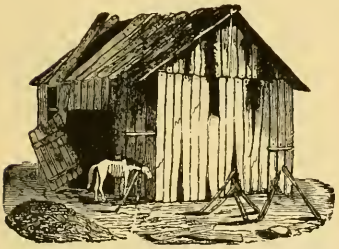
FARMER UNTHRIFT'S BARN.

VII. Farmer Unthrift's Home.

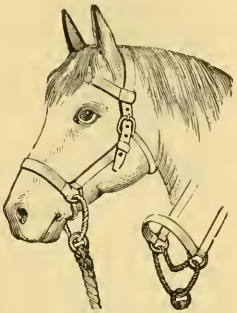
FARMER UNTHRIFT'S HOME.

Such a man will raise his colts from spavined and broken down mares; they will shift for themselves upon scanty pasture in Summer, and in the brush in Winter. He believes in hardening his stock, and he does it; hardens them into "runts," not worth a month's keeping. They are literally broken to work, broken in body and temper with cruel blows; they are halter-broken too, the halter is a rope knotted about the neck, like the poor old horse shown on next page, tied outside the barn for the benefit of the fresh air it may get; a starved out skeleton horse, contemplating the skeleton of a barn. Even in such a barn there are capabilities that may be utilized for comfort. It may be reshingled, and new clapboarded, and the doors hung on their hinges. It may even be patched up so as not to leak, and be banked up to keep out the cold. But will it

be? Hardly! The picture of the old house, the wreck of a horse, the old rope around the neck, the rotten barn, all tell of more money spent at the dram-shop than for the maintenance and comfort of the family or the well-being of the stock.



THE BARN OF THE CRUEL MASTER.



A MODEL HALTER ON A MODEL COLT.

VIII. The Careful Man's Theory.

As an accompaniment to this we give an illustration of a well-kept colt in a model halter for unbroken horses. By slipping both ends of the chin strap through the ring of the tying rope, it is a halter for a well broken horse. The man who possesses such stock and fixtures may not be rich; probably is not, but he is a careful, thinking, reading, methodical man, who believes in doing everything well. He uses no cruel bridles, gives his colts no excuse for getting cast in their halters. His harness seldom galls the team, and when it does, it is remedied at the first indication. However dirty his team goes into the stable, it always comes out clean and blooming; not only this, such a master never finally leaves his team for the night, after a hard day's labor, until it is dry, well groomed, well littered down, and in every way comfortable for the night. In the morning his team are always ready for the field or road; and however eager or spirited they may be, will travel along together, either ahead of or behind the master, and looking like the picture that we here give on following page—a lordly team, that only could belong to a kind and considerate master.

They are not too many. The cruel, or shiftless, or drunken masters are plenty enough. The farm stock of many get barely enough to eat, and that in an irregular and improvident kind of way. They never pull very heavy loads, the master has not many to haul, and he believes in

skim plowing. When he comes home, he "runs them into the barn," such as it is; or they take the yard for it, and in the morning very closely resemble the picture on the left:

TEAM OF THE KIND MASTER.

TEAM OF THE CRUEL MASTER.

A "humped up," hungry, thirsty pair of servants to a cruel, because improvident master.

Such a man may not be cruel in the sense of beating. He may be really a kind-hearted man, a good neighbor, "thoroughly honest, as the world goes," he may even be a good Christian man, or *think* so at least. He is cruel nevertheless. More cruel perhaps than the brute who belabors his beasts and then repents. Cruel in his improvidence, in his neglect of his farm and his stock.

HIS DOOR-YARD GATE.

HIS FIELD-GATE

Is it any wonder that in the morning the team should be found in the yard, waiting for their breakfast. The wonder is that there should be anything, either in the house or out for either man or beast to breakfast on.

If to neglect we add a cruel or brutal disposition, the animals of the farm are to be pitied, and the household likewise pitied, and prayed for.

This chapter is pictorial, and not particularly given to practical information on the care of horses. It is a chapter of contrasts, and given deliberately, as indicating far more eloquently than mere words can, the difference between careful and kind treatment of stock, and cruel or

neglectful treatment. It is, in fact, the story of thrift and unthrift. We expect few whom it might benefit will see it. The unthrifty man whom we have depicted, seldom sees books, and we might almost say, never buys one. Those however who do, may perform good missionary work among the class we have represented, by showing them how quickly thrift will follow good intentions, religiously kept, backed up by honest industry, guided by careful judgment, and accompanied by a will to perform. It will repair houses and barns, build gates and fences, cultivate smiling fields, rear and train good stock, lift the mortgage off the farm, educate the growing family, and bring comfort and happiness to a once cheerless and suffering family.

IX. Using the Means We Have.

In the foregoing, it is not to be understood that expensive appearances are necessary for training a horse, neither is it to be understood that costly buildings are necessary. We have stated more than once that any farm animal may be kept in the most comfortable manner, in a structure made of poles and hay, and we will add, kept in as good health as in expensive stables. The reason is that the master who uses care in making a simple structure warm and comfortable has humanity to start with, and generally gives his own personal care and supervision, while in costly stables the animals are usually left to the care of men hired for the purpose. The owner, often, from the pressure of other business pursuits, being unable to do more than to drive a favorite animal or team. In perhaps a majority of cases he knows little or nothing of how a horse should be cared for, and of course nothing as to the fitness of those whom he pays for doing the work.

The object of this work is to present in a condensed form the best practices, founded upon common sense, and the experience of superior stockmen in the care of animals. A study of these pages will enable any person to acquire a good idea of the simplest and best means for arriving at a correct knowledge of how animals should be bred, raised, fed, trained, and cared for. He may thus understand how to do the work himself, or, in case he be a man of business, or wealth and leisure, he may quickly know whether the help he relies on are doing their duty, not only in feeding and cleaning, in exercising and the general care of the animals under them, but also know at a glance, whether the animals are treated with the kindness and consideration that dumb brutes, but faithful servants, deserve from man.

X. An Infallible Rule.

We have known a brutal stable-man to flog a horse in the most terrible manner, simply to get rid of his own ugliness, as he expressed it, while at ordinary times he petted and made much of the animal. Such an animal will be frantic at the sight of a whip held in a threatening manner. Animals that are in the habit of being struck with the pitchfork, or being kicked and cuffed, will watch carefully the stable-man, and show by their nervousness in the stable what they are expecting, while of the master they will show no sign of fear. Stable-men are often cunning creatures; they will have soothing words to quiet the animal in the presence of the master. We have always held that the horse should be spoken to firmly but quietly, and always have an inherent suspicion that a team exhibiting signs of fear at times, where we always hear the keeper speaking to them in soothing tones, are abused in secret.

No sane man would practice such treatment to his own stock, and no man who is obliged to leave valuable animals in the care of servants should fail to know that they are doing their duty. It is not enough that the stable-men feed the regular rations, that they clean and exercise properly. It should be made important that in all their intercourse with the animals under their care, they be not unduly punished, nor in any other respect abused.

CHAPTER X.

HOW TO BUY.

I. HOW TO GET CORRECT INFORMATION.——II. THE BUYER MUST KNOW WHAT HE WANTS. ——III. PROPORTIONS OF THE HORSE.——IV. THE CLEVELAND BAY FOR PROFIT. ——V. HOW TO BUY A TROTTING HORSE.——VI. ONE MUST KNOW WHAT HE BUYS FOR.——VII. THE LIGHT HARNESS HORSE.——VIII. SADDLE HORSES OF ALL GAITS.——IX. THE HIGH-BRED HUNTING HORSE. ——X. RACING HORSES. ——XI. WHAT THE RACER SHOULD BE. ——XII. TO AVOID VICES AND DEFECTS—HOW TO DETECT. ——XIII. OTHER FAULTS AND IMPERFECTIONS.

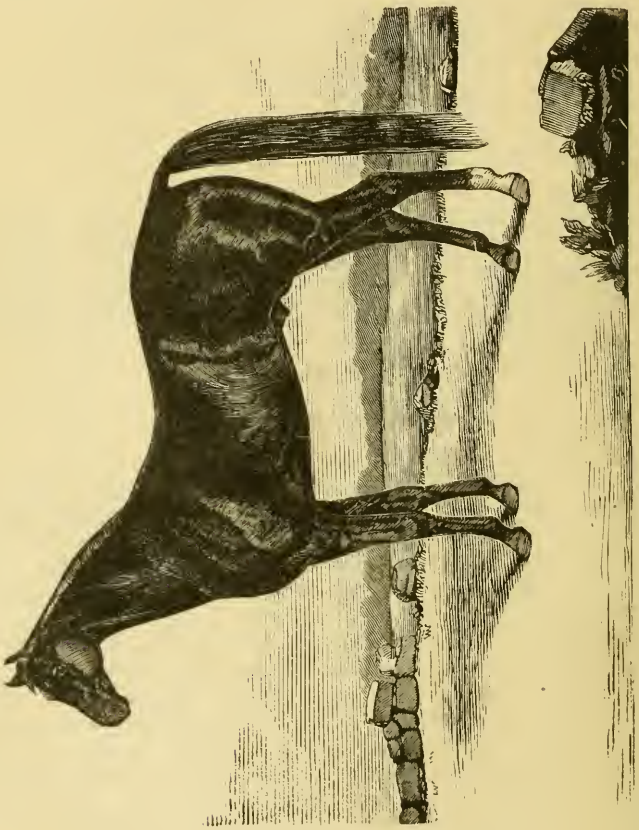
I. How to Get Correct Information.

Every horse owner sooner or later becomes a judge of what he is buying. If he depends entirely upon the lessons learned through cheats that are practiced upon him by sharp jockeys, life is too short for him ever to become an adept in distinguishing vice, unsoundness, "dosed up" and used up horses as among the various tricks and swindles practiced upon the ignorant and unwary. Generally after being cheated, or absolutely swindled a few times, the breeder goes to the only correct source of information, concisely written and carefully illustrated books. He is thus enabled not only to study, but subsequently to carry in his mind what he has read and seen; he comes to compare critically the living animal with the illustrations and descriptions, and thus becomes an expert himself, and in a hundredth part of the time by which he could acquire correct information in any other way. This is precisely the means used by any professional man in the acquisition of true knowledge in the pursuit of his profession, whether it be in a learned profession or in the education to practical art. Thereafter practice makes perfect.

II. The Buyer Must Know What he Wants.

Suppose he is looking for stock from which to breed trotting horses. He must then consider the type of horse he wishes to breed; whether for

speed alone, or for style and speed. That is, first class road horses, or large, strong, able horses, combining in as great a degree as may be large size, strength, endurance and such style as may be conformable with this class of horses.



HIGH-BRED ROADSTER.

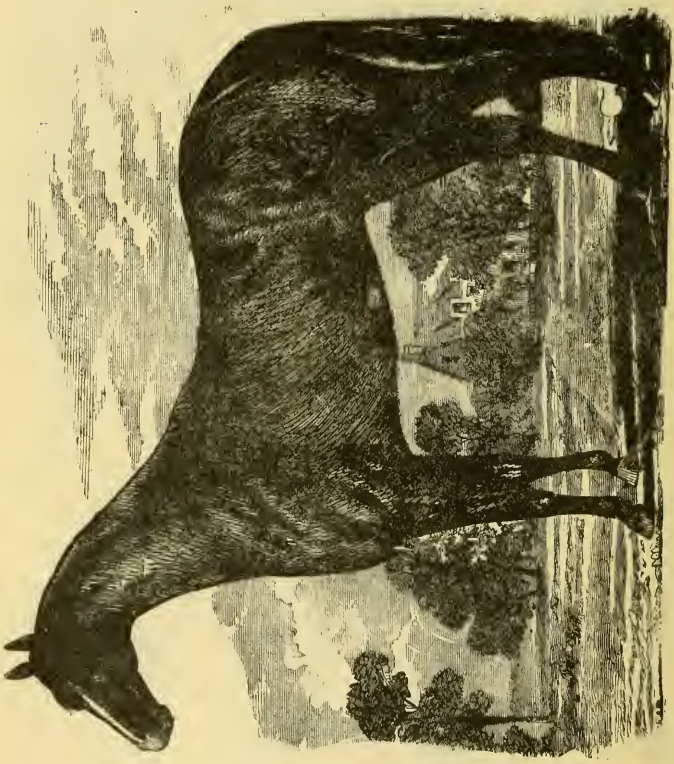
As showing what may be done in colts got by breeding up out of roomy mares of fair style, bred to high class trotting stallions, we give three cuts of stallions, certainly good enough for sires, and as models of what such horses should be. The first showing eminent breeding, with

style enough: rather straight on his fetlocks, according to the idea of many good horsemen, but with length enough, from our standpoint, to give flexibility. A horse compact and smooth, with excellent flat and

FINELY-BRED ROADSTER.

sinewy limbs, good feet, ample chest, good lungs, fine eye, broad forehead, and strong jaws. The head not the ideal of modern "blood horsemen," but nevertheless showing docility and intelligence in a high degree. Showing also high breeding in every part.

The cut on page 133 is of a horse of great style and endurance, fine all over. A horse that will go with his head well up; limbs exceedingly fine, mane rather light, but with plenty of tail, as a horse should have; evidently showing Morgan blood, dashed with Bell Founder and other thorough blood.



A GOOD FAMILY HORSE.

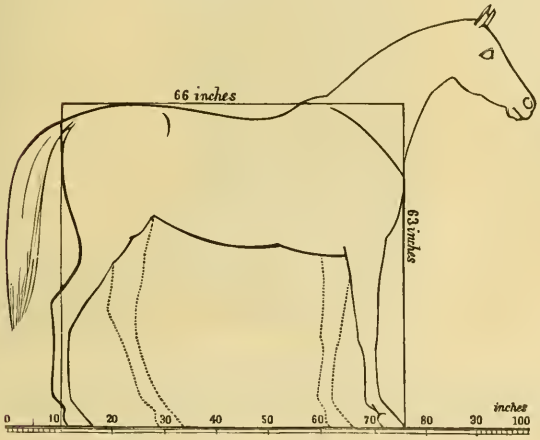
Between the two, for real and intrinsic merit, the first should be taken. There is plenty of style about him, and strength. There is also a body of fine character on limbs of great power. Such will be found acceptable and sought after always by gentlemen wanting a single horse, or a pair for driving on the road, or for driving in the city park-ways in the

afternoon. Either of the two will make capital and stylish saddle horses, if well trained, such as no gentleman of ordinary weight or any lady need be ashamed of when taking the afternoon trot or canter on the fashionable boulevards or park-drives of our large cities, or on the streets or roadings of cities having no parks. The first the best horse, the second the most stylish.

The third cut we give is that of a horse of large size and strong build, adapted for drawing as a single horse for the coupe, or one of a team to the family carriage; as one of a pair for a coach or barouche; one that will give satisfaction almost anywhere, if not driven over eight miles an hour, and capable as well of hauling loads on good roads, at a fast walking pace.

A horse of this stamp, sixteen to sixteen and a half hands high, not particularly heavy set, rather long-limbed, with rangy neck and good head, with plenty of spirit, and weighing about 1200 pounds, may be called a *general utility horse*. Such will command ready sale at any time, if well broken and trained, say at from $200 to $300 each, and if particularly nice and well matched, often at $800 or $900 the pair, as carriage horses when five or six years old.

III. Proportions of the Horse.



PROPORTIONS OF THE VARIOUS PARTS.

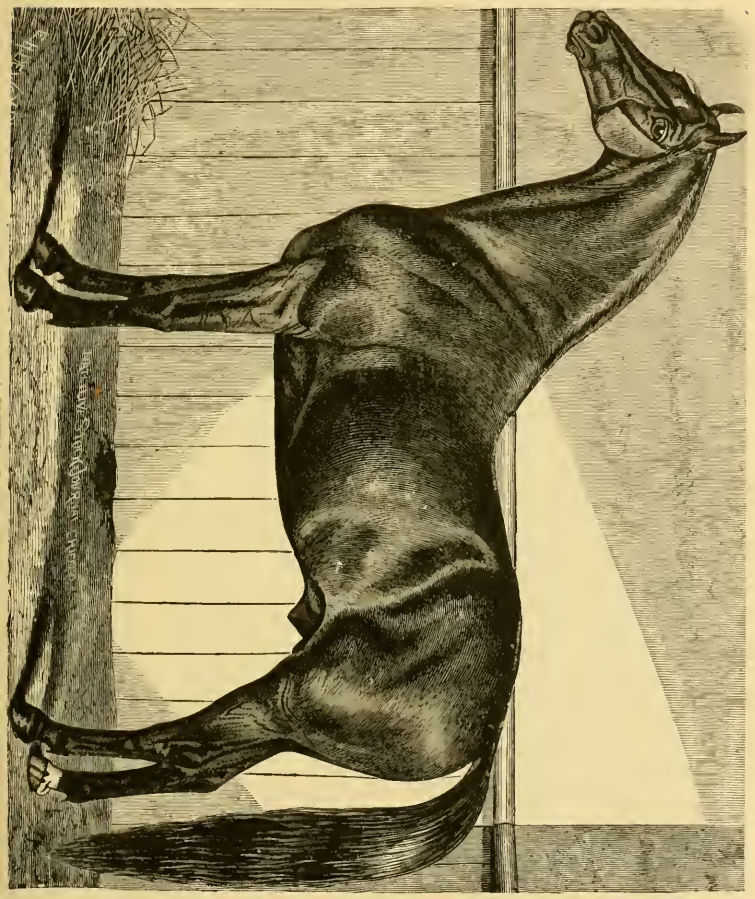
To arrive at a clear understanding of the proportions of the horse, we give an outline that will be a good study, not only for the beginner, but

will be valuable for reference for any horseman, however expert he may be. This illustration combines the average measurements of six horses, accepted for perfect symmetry, and taken, says Mr. J. H. Walsh (Stonehenge)—one of the most graphic and lucid of English writers on the horse—two of them from celebrated stallions, two from thorough-bred hunters, and two from chargers of great value. This, therefore, will not apply to draft horses, but it will be found that the nearer the general utility horse comes to these measurements, the better he will be.

	Inches.
Height	63
Length from shoulder-point to quarter	66
From the lowest part of the chest to the ground	36
From the elbow-point to the ground	39
From the withers to the pole, just behind the ears, *in a straight line*	30
The same measured along the crest	32
Length of head	22
Width across the forehead	9 1-2
From the withers to the hip	22
From the stifle to the point of the hock, in the attitude shown in the plan	29
From the root of the tail to the stifle-joint	26
From the point of the hock to the ground	23 1-2
Length of arm from the elbow to the pisiform bone (the rear bone of those forming the upper articulation of the knee)	19 1-2
From the pisiform bone to the ground	19 1-2
Girth varies from	78 to 79
Circumference of fore-cannon bone (large metacarpel or shank bone, extending from the knee to the fetlock)	7 1-2, 8, 8, 8, 8 1-2 and 9
Circumference of arm just below the elbow	16 1-2 to 18

The foregoing is not to be taken as a fixed rule in comparing ordinary horses, nor even those well-bred. Eclipse, for instance, may be given as a most wonderful horse, differing in many material respects from these measurements. He was three inches taller at the withers, and yet higher in the croup than at the withers. His head was of the same length as the average given, but it is said to have been twelve inches across at the forehead. He was a big horse in every respect; tall, lengthy, capacious in body, higher behind than before, his neck and back long, the loin roached, his limbs would by some be called long, but they were strong with large joints, but fine; his quarters straight, square and extended; thighs long and muscular; shoulders only moderately oblique, and of fair depth; his knees and hocks broad and well formed; head small, and as will be observed from its great breadth of forehead, Arab-like. On the whole it would probably be difficult to improve the proportions of Eclipse, simply as a weight-carrying racer. For the hunting field, the fine saddle horse, or any of the uses to which practical men put their horses, aside from flat racing, select as many of the superior points of

Eclipse as you can find, but leave out the low withers and high croup. The horse that will come to the standard that we have given in the diagram, is as a rule the horse to buy.



IV. The Cleveland Bay for Profit.

Of late years this admirable and stylish horse as improved from the

old farm horse of fifty years ago, has attracted attention in the United States, and especially in the West, where many fair specimens have been imported. As showing the characteristics when standing extended and at rest, we give a portrait of a pure bay, in color, with a star in the forehead, and one white hind fetlock. These dashes of white not detracting from the style of any horse, and showing breeding. It is a horse showing blood and breeding, with lofty crest, magnificent withers, round barrelled, and clean limbed, a coat like satin, and a head of excellent proportions. Colts from such a horse out of large, roomy mares of good style, will always sell for high prices. When you find such a stallion do not be afraid to buy, he will pay, and his foals will pay for their feed and training.

The old fashioned horse of this race, the Cleveland bay, is extinct and gone. The present form is the result of crosses with staunch thoroughbreds, giving better form throughout, greater speed and eminent style. We consider them as among the very best from which to breed stylish animals from proper mares. Horses that may do the ordinary farm work until six years past, and then be sold at good prices for stylish omnibus, express, light draft, and carriage horses in our cities. Farmers who have large, well built mares, wishing to breed colts that shall have size enough for any farm or road work; that will breed to uniform color, so that they may be easily matched; that will have style—not that of the blood horse, or light driving, or trotting horse—will do well to investigate the characteristics of the Cleveland bays. Canada has acquired a high reputation for stylish, well matched coach horses. It is founded in a great measure upon crosses produced by breeding the modern Cleveland bays upon large, handsome mares of more or less breeding.

Such horses if properly cared for will do eight or nine miles an hour, in harness, and under the saddle may be pushed up to twelve miles an hour; are active in all their gaits, tractable, easily managed, intelligent, fast walkers, always ready for their feed, and as eager at labor, as they are kind and intelligent every where. The late Henry William Herbert, (Frank Forester), a thorough horseman, an accurate judge of horse flesh, and a finished writer, in his voluminous work, "The Horse of America," thus describes the original Cleveland bay, and also the improved horse of his time: "The Cleveland bay, in its natural and unmixed form, is a tall, powerfully built, bony animal, averaging, I should say, fifteen hands three inches in height, rarely falling short of fifteen and a half or exceeding sixteen and a half hands.

The crest and withers are almost invariably good, the head bony, lean, and well set on. Ewe-necks are, probably, rarer in this family than in any other, unless it be the dray-horse, in which it is never seen.

The faults of shape to which the Cleveland Bay is most liable are narrowness of body, and flatness of the cannon and shank bones. Their color is universally bay, rather on the yellow bay than on the blood bay color, with black mane, tail, and legs.

They are sound, hardy, active, powerful horses, with excellent capabilities for draft, and good endurance, so long as they are not pushed beyond their speed, which may be estimated at from six to eight miles an hour, on a trot, or from ten to twelve—the latter quite the maximum—on a gallop, under almost any weight."

The large and more showy of these animals, of the tallest and heaviest type, were the favorite coach horses of their day; the more springy and lightly built, of equal height, were the hunters, in the days when the fox was hunted by his drag, unkennelled, and run half a dozen hours or more, before he was either earthed or worn out and worried to death. Then the shorter, lower, and more closely ribbed up were the road hackneys, a style of horse unhappily now almost extinct, and having unequally substituted in its place a wretched, weedy, half-bred or three-quarters-bred beast, fit neither to go the pace with a weight on its back, nor to last the time.

From these Cleveland Bays, however, though in their pure state nearly extinct, a very superior animal has descended, which, after several steps and gradations, has settled down into a family common throughout all Yorkshire and more or less all the mid-land counties, as the farm horse, and riding or driving horse of the farmers, having about two crosses, more or less, of blood on the original Cleveland stock.

The first gradation, when pace became a desideratum with hounds, was the stinting of the best Cleveland Bay mares to good thorough-bred horses, with a view to the progeny turning out hunters, troop horses, or, in the last resort, stage-coach horses, or, as they were termed, machines. The most promising of these well bred colts were kept as stallions; and mares of the same type, with their dams, stinted to them produced the improved carriage horse of fifty years ago.

The next step was putting the half-bred fillies, by thorough-breds out of Cleveland Bay mares, a second time to thorough-bred stallions; their progeny to become the hunters, while themselves and their brothers were lowered into the carriage horses; and the half-bred stallions which had been the getters of carriage horses were degraded into the sires of the new, improved cart horse.

V. How to Buy a Trotting Horse.

In no class of horses should the purchaser be more particular than in trotting horses, whether they be for the road or the turf. In this case

the judgment must be most critical. The mere looks of the horse is not the most important point. In the first place the animal must be entirely free from any blemish that could by any possibility be construed into

GOLDSMITH MAID.

unsoundness, in its incipient stage. The animal may not be handsome, to the uneducated eye, none ever are, when fined down for work. To illustrate this we give a portrait of Goldsmith Maid, a phenomenon such

as seldom appears on the turf. In her trained form she is goose rumped and inclined to be ewe-necked. An ordinary observer seeing her hitched to a wagon in the field, might pass her unobserved. Not so the critical horseman. The mighty framework, great chest, magnificent limbs, the wonderful length from the stifle to the hock, the muscular form, all tell of wonderful force, put together for business, and without waste.

Let us see what her record is, for this tells the whole story. Fast and continued exertion at trotting means display of great muscular power. It is as valuable in a horse in any other direction as in the exhibition of speed.

HER GREAT TRIALS.—The fastest time, meaning up to the date given, all in harness, is as follows:

IN HARNESS.—Fastest one mile, Goldsmith Maid, Mystic Park, Boston, Sept. 2, 1874, time 2:14.

Fastest 2d heat, Goldsmith Maid, Mystic Park, Boston, Sept. 2, 1874, time 2:14.

Fastest 3d heat, Lula, Buffalo, N. Y., Aug. 10, 1875, and Goldsmith Maid, Buffalo, Aug. 3, 1876, time 2:15.

Fastest 6th heat, Goldsmith Maid, Hartford, Sept. 1, 1876, time 2:19 3-4.

Fastest two consecutive heats, Goldsmith Maid (2d and 3d), Buffalo, Aug. 3, 1876, time 2:16—2:15 1-4—2:15.

Fastest four-heat race, Rochester, Aug. 14, 1875, Goldsmith Maid winning the first heat, and Lula the next three, time 2:15 1-2—2:16 1-2—2:15 1-2—2:17.

Fastest five-heat race, Cleveland, July 27, 1876, Goldsmith Maid winning the first two, and Smuggler the succeeding three heats, time 2:15 1-2—2:17 1-4—2:16 1-4—2:19 3-4—2:17 1-2.

Fastest six-heat race, Hartford, Sept. 1, 1876, Smuggler winning the first two, making a dead heat with Goldsmith Maid for the third, and the Maid winning the next three, time 2:15 1-4—2:17—2:16 3-4—2:17 1-4—2:18—2:19 3-4.

If we compare this with other records of fastest time in various ways of going, and at all ages, it will be seen that the American trotting horse, owing as the best of them do, their superior qualities to the thorough blood in them, are not at all inferior to their racing congeners of the turf.

That many turf-men are ill-bred and tricky is unfortunate. It does not detract from the real merits of a useful servant to man, and one of the noblest animals on the face of the earth.

The fastest time of other celebrated horses will be interesting in this connection, and hence we give the record as follows:

Fastest two miles, Flora Temple, Eclipse Course, L. I., Aug. 16, 1859, time 4:50 1-2.

Fastest three miles, Huntress, Prospect Park, L. I., Sept. 23, 1872, time 7:21 1-2.

Fastest four miles, Trustee, Union Course, L. I., June 13, 1849, time 11:06.

Fastest five miles, Lady Mack, San Francisco, Cal., April 2, 1874, time 13:00.

Fastest ten miles, Steel Grey, Birmingham, Eng., April 13, 1876, time 27:56 1-2.

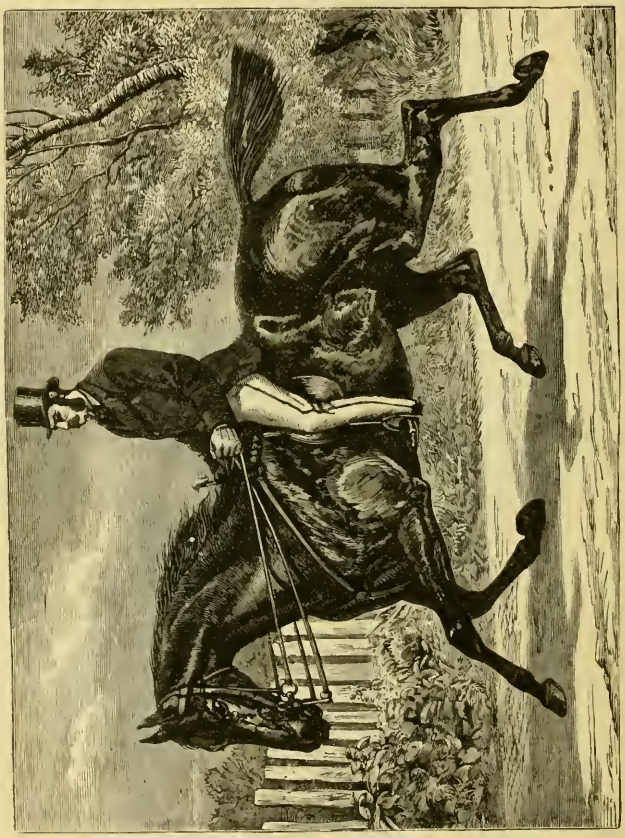
Fastest twelve miles, Topgallant, Philadelphia, 1830, time, 38:00.

Fastest fifteen miles, Girda, San Francisco, Cal., Aug. 6, 1874, time 47:20.

Fastest twenty miles, Capt. McGowan, Boston, 1856, time 58:25.

Fastest fifty miles, Ariel, Albany, N. Y., 1846, time 3:55-40 1-2.

Fastest one hundred miles, Conqueror, Long Island, Nov. 12, 1853, time 8:55:53.
Fastest 1st heat, Smuggler, Harttord, Conn., Sept., 1, 1876, time 2:15 1-4.
Fastest 4th heat, Lula, Rochester, N. Y., Aug. 14, 1875, time 2:17.
Fastest 5th heat, Smuggler, Cleveland, July 27, 1876, time 2:17 1-2.



MOVEMENT IN TROTTING.

Fastest four consecutive heats, Smuggler (3d, 4th, 5th, 6th), Hartford, Sep. 1, 1876, time 2:16 3-4—2:17 1-4—2:18—2:19 3-4. (At Rochester, Aug. 14, 1874, Gloster trotted a four-heat race in 2:18—2:17 3-4—2:17—2:19, the first being a dead heat with Red Cloud; the aggregate time of the four heats being the same in both races; but the former is unquestionably the better performance.)

COLT RACES IN HARNESS.—Fastest mile by a yearling—Memento—Lexington, Ky., Oct. 10, 1877 (not a record), time 2:56 3-4.

Fastest mile by a two-year-old—So-So—Lexington, Oct. 12, 1877, time 2:31.

Fastest mile by a three-year-old—Elaine—Hartford, Sept. 19, 1877, time 2:28.

Fastest mile by a four-year-old—Keen Jim—Lexington, Oct. 12, 1877, time 2:24 1-2. (Governor Sprague trotted a mile, as a four-year-old, at Buffalo, Aug. 10, 1875, between the heats of a race, in 2:21 1-4, as timed by the official judges of the course; but, as it was not in a race, the time does not constitute a technical record.)

Fastest mile by a five-year-old—Gov. Sprague—Poughkeepsie, Aug. 22, 1876, time 2:20 1-2.

TROTTING TO WAGON.—Fastest one mile, Judge Fullerton, San Francisco, Nov. 1874, time 2:20 1-2.

Fastest two miles, Gen. Butler and Dexter, each a heat, Long Island, 1863, time 4:56 1-4.

Fastest three miles, Kemble Jackson, June, 1853, time 8:03

Fastest four miles, Longfellow, Dec. 31, 1869, time 10:34 1-2.

Fastest five miles, Little Mack, Long Island, Oct. 29, 1863, time 13:43 1-2.

Fastest twenty miles, John Stewart, Long Island, Sept. 22, 1868, time 59:23.

MISCELLANEOUS.—Fastest one mile, under saddle, Great Eastern, Fleetwood, N. Y., Sept. 24, 1877, time 2:15 3-4.

Fastest one mile, double team, Small Hopes and Lady Mack, Fleetwood, N, Y., Sept. 11, 1877, time 2:23.

Fastest one mile, with running mate, Ethan Allen, Long Island, June 21. 1867, time 2:15.

VI. One Must Know What he Buys For

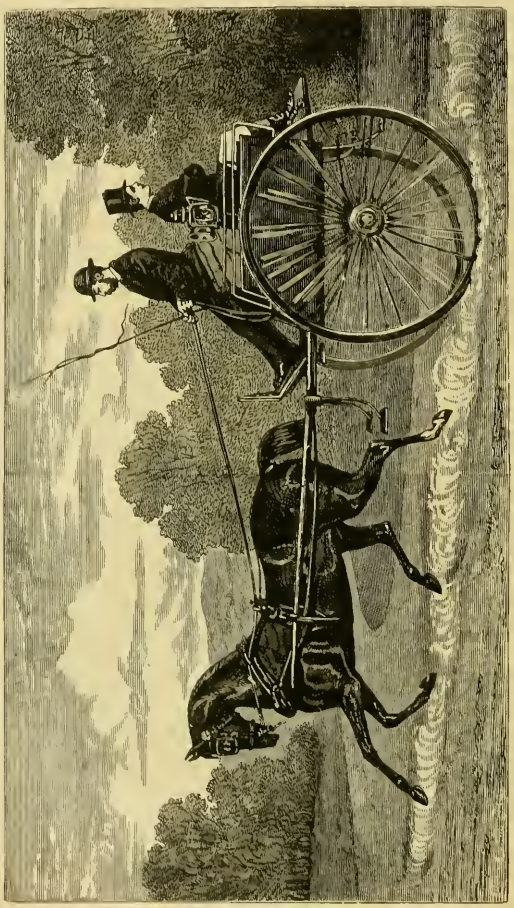
In buying a trotting horse, one must first make up his mind just what the horse or team is wanted for. If simply for speed, all that is necessary is simply to examine the record made. No fast trotter is ever bought, except by its record. In the case of an untried colt, there are other considerations. The colt may grow up very fast, or only of moderate speed. The inquiry then to be made, if the young thing has brothers or sisters of a trotting age, is to examine their record. If not, examine the record of the sire and dam of the mother of the colt, and the record of the produce of the colt's sire. If they are good, the chances are in the colt's favor. If bad, the chances are against him.

Again, if the colts are to be used for driving on the road, style and handsome action, may or may not be the prime integers. If mere speed here is the requisite, buy a trotter of the fastest gait your purse will allow. For road driving the style is regarded—and very properly so—as of as much or more consequence than mere speed. In this the buyer should study the different illustrations we give of form, style and make-up.

VII. The Light Harness Horse

In many cases, where the roads are superior, and the animal is used in a vehicle of the lightest construction, to carry only one person, size is

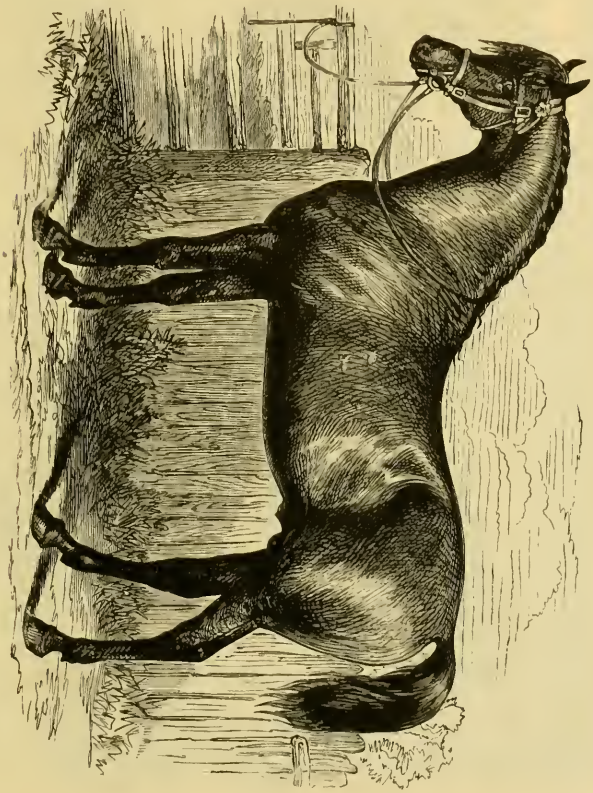
not always necessary. Very many horses of fourteen and a half hands, are exquisitely handsome and capable of very fast work. One of the best we ever knew was a St. Lawrence mare fourteen hands high, that



A FINE TROTTER IN LIGHT HARNESS.

very few large horses could get by on a smooth road—the "Baby," as she was called—when driven on a track, always going as a pacer.

The illustration on opposite page is of an English light harness, two-wheeled turn-out, a vehicle now occasionally patronized by fast living young gentlemen. For style of going, the horse is as perfect as he is handsome in his make-up, but not showing the high knee action considered stylish with all two-wheeled turn-outs.

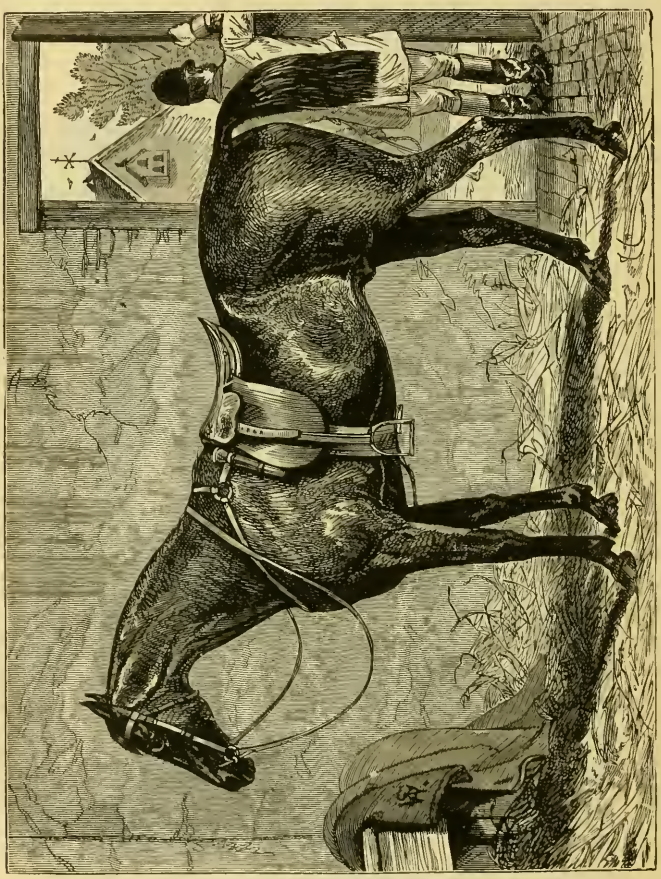


A GOOD FORM FOR SADDLE HORSE.

VIII. Saddle Horses of all Gaits.

It has always seemed a pity that farmers' sons have not taken more kindly to the saddle than American youths do. It is well enough for

men of mature age to favor the buggy or light wagon, but every young man and woman raised in the country should be taught to sit a horse perfectly, and to manage him at all gaits. In the South this is the case, but



A HORSE OF GOOD ACTION.

in the North the perfect saddle-seated rider is rarely found. Lately, thoroughly trained saddle horses are much sought after in our cities, and certainly there is no place where they may be so perfectly trained as in

the West. Every respectable farmer should have at least one well trained saddle horse to sell when called for. Twelve months training will put them in form. For good wear-and-tear, compact, able as a good leaper, of fine form, and undoubted bottom for any distance, the illustration, page 145, will give an idea of what such a saddle horse should be.

IX. The High-bred Hunting Horse.

When a long stride, great leaping powers, and ability to go long distances at high speed is required, the horse should be not less than one-half to three-quarters bred. A greater proportion even is favored in the South, where the passion for hunting is only second to that in England. The illustration of a horse of extra good action as given on page 146, will be seen to combine size, indicating capacity for carrying great weight; high breeding, as shown in the crest and head; wonderful lungs; great length of hip and limbs, and being near perfection as possible; a high caste horse that will not fail his rider in time of need.

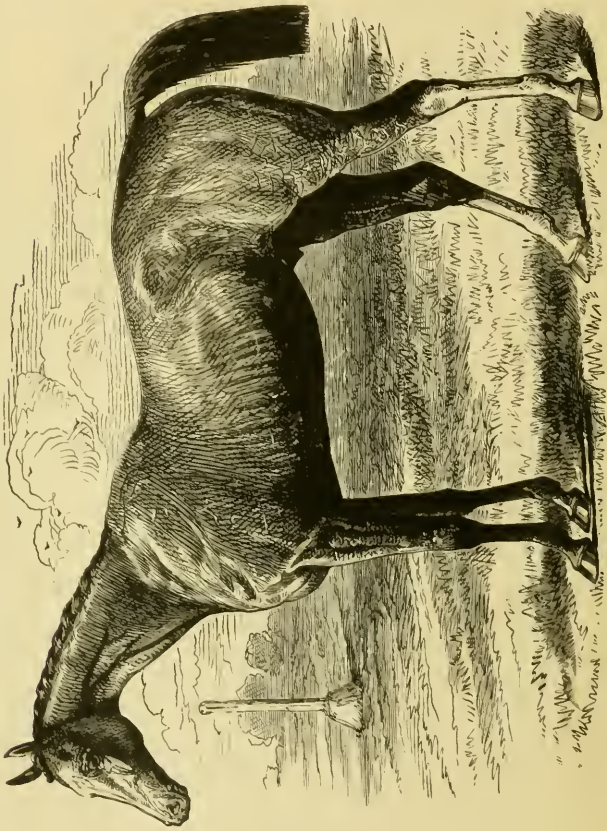
X. Racing Horses.

There is one more class of saddle horses worthy of special notice: the thorough-bred racing horse, the foundation upon which has been built all that is valuable in every horse where speed, bottom, elegance, and great bone, sinew and muscle in every respect are required. It is the fact that on the race course there have been schemes and tricks practiced, probably there always will be those scandalous in the extreme, but frowned upon by all breeders of respectability. Among the more respectable associations rules of the most stringent character have been drawn, and fairly lived up to. If dishonest jockeying can be still further eliminated the true animus of the turf may have a bright future before it in still farther improving the breed of staunch thorough-breds, capable of carrying weight, and with bottom to get the rider two, three and four miles at high speed. These are what are really wanted, and not those that at the end of a quarter or a half mile are entirely blown and jaded, or as an Englishman would express it, quite "pumped out."

XI. What the Racer Should Be.

The model racing horse should be from fifteen and a half to sixteen hands high, full and muscular in his build, with clean, sound limbs, short backed, round in the barrel, with long hips, deep and oblique shoulders,

a rangy and not too muscular neck; a head fine, bony and with rather large muzzle and prominent nostrils, broad in the forehead, with a full, bright, but mild eye, denoting a high nervous temperament, uniting



A MODEL FORM FOR SPEED IN RUNNING.

great courage with docility. The accompanying illustration will give a correct idea of a horse of great speed, high courage and lasting powers of endurance.

XII. To Avoid Vices and Defects—How to Detect.

They are legion, and he who at present buys any horse, whether for speed or work, must be on his guard against them. Among the principal disabilities to be guarded against are:

1.—Bone spavin, curb, ring-bone and splints.—To detect these look at the horse from before and behind, for spavin and curb at the hocks; for ring-bone, at the fetlocks; and for splints, below the knee. Feel the bones at all these parts for tenderness or enlargement. If they appear, reject the horse instantly. He will be worthless as a sire, or for riding or driving.

2.—Stumbling.—Examine the knees to find if they are scarred, or show the marks of previous injuries, or that have been operated upon for callosities. Then walk him over somewhat rough ground, and at a slow pace, with an entirely loose rein, to see if he trips or goes weaker on one leg than on the other. If he is a stumbler, he is the most dangerous animal a man can own, unless it be a kicker; in fact, more so than the latter, since kicking may be guarded against, when knowing the vice.

3.—Kicking.—If this is suspected, the animal will lay back his ears if approached in an apparently careless manner, though horses do this sometimes from mere playfulness. If they are vicious, they will lay their ears more completely back, and the eyes will also denote their intention. Examine the stall where it is known they have stood for marks of their hoofs, and above all, give the animal a chance to show his propensity when the groom is not near.

4.—Pulling at the halter or bridle when tied.—Tie him up in a close yard, with a halter he can easily break, leaving him quite alone for about half an hour, to exhibit his propensity if he will.

5.—Crib-biting.—If the horse is a confirmed crib-biter, his teeth—the central incisors—will show wear where he has grasped objects to enable him to get leverage to perform the operation. Tie him out to a stump, or at a post about three feet high, and watch him, no person being in his sight.

6.—Balking and backing.—Horses seldom balk under the saddle; when they do, they are dangerous in the extreme, often stopping suddenly when under motion, or backing into dangerous places. It is difficult to detect, for they will sometimes go days, weeks and even months all right, and then suddenly show the vice. As a rule, it is exhibited by bad tempered, badly trained horses. A warrant from a respectable owner is the best guarantee. It may sometimes be detected, if a person strange to the horse mounts and attempts to start him sud-

denly. In harness it may often be detected by the manner in which the animal starts and travels.

7.—The Rogue.—The rogue is the horse of vices; he may take the bit in his mouth and run away, he will rear, back, kick, strike, bite, and do twenty other unpleasant tricks, not always from pure vice, but often from exhuberance of spirits, or from being crossed in some way. They generally perform well enough after they have found out that their rider is their master. They are difficult to detect in their vices, except by the thorough horseman, well versed in every expression and act of the horse.

8.—Bishoped Teeth.—So named from the scoundrel who invented filing an old horse's teeth to make him look young, even to burning and blackening the cups formed. A careful study of the chart of the horse's teeth, given in this book, will enable any person to detect this, since it is impossible to cover the shrinking of the gums, by which the teeth show narrow, and are peculiar in shape.

9.—Weak Eyes.—Whatever the occasion, have nothing to do with a horse with bad eyes. Bring the animal from a rather dark stable just inside the door where the full light may strike the eyes. Examine the lids and pupils carefully, to see if there is any considerable shrinking; the eye should be able to bear the full light. Horses are sometimes nearsighted, and also far sighted. *Nearly all shying horses become so either from defect in vision* or from cowardice.

10.—Moon Eyes.—This is a specific ophthalmy, from which one or both eyes periodically change color, and during the paroxysm it may become entirely blind. During the interval the eyes look natural. It is better, if the buyer suspects this, to take a warranty against it.

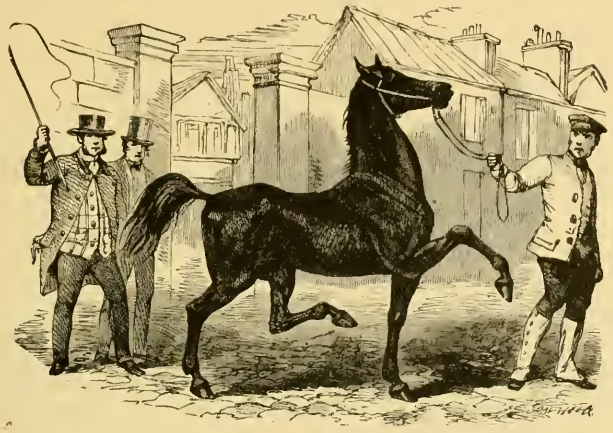
11.—Blindness.—This is sometimes difficult to detect by the ordinary observer by looking at the eyes. In rare cases the eyes may seem natural. A blind horse, however, may be detected by his mode of progression. As an example we give an illustration showing the mode of progression of a totally blind horse.

XIII. Other Faults and Imperfections.

The disabilities noticed in the previous sections are those of positive unsoundness, or else of determined vice. Some others that should not be overlooked, are easily discovered by careful examination and test. These are:

1.—Glass Eye.—This, if not complicated with specific disease, does not interfere with sight in any respect. It is a serious defect, simply so far as looks are concerned. Usually only one eye has this peculiar white

glassy appearance, the pupil perfect, and the iris quite natural. It should affect the price of the animal, only as detracting from elegance.



THE MODE IN WHICH A HORSE PROGRESSES WHEN BLIND.

2. White Spot.—Sometimes a small white spot will appear on the eye of a young horse, generally after three years of age, and usually near the outer corner. It has a peculiar cloudy appearance, sometimes increasing to the size of a hemp seed, and occasionally larger. The duration is variable, sometimes lasting for years, and again disappearing in a short time. It really impairs the vision but little, if any. Unless its history is known a veterinary surgeon should decide whether it is incipient cataract or not. Some veterinarians have termed it spurious cataract, but this is entirely a misnomer. The name white spot describes it perfectly.

3. Roaring.—This is the result of obstruction in some part of the larynx or trachea, impeding the breath, and causing a peculiar roaring sound when the animal is in motion. It is rarely found in the United States, being chiefly confined to draft horses. It is often the result of chronic cough. In England it is quite common, and when present in a horse of fast work, will render him worthless for the road. It may be discovered by urging the horse to a fast gait.

4. Oblique Tail, or Wry Tail.—This is caused by contraction of the muscles of the tail on one side. It may sometimes be improved by a surgical operation, and should be considered a serious defect in any horse, and especially so in a driving horse.

5. Turning the Toe of the Hoof out or in Unduly, Sand Cracks, Quarter Cracks, Dish Hoofs, Over-reaching, Interfering, etc., are all to be looked for before finally buying a horse. They are all disabilities that should not be present where the purchaser pays full price for the animal. They are, however, all so apparent that the purchaser is to blame if he fails to see them.

6. Wolf Teeth.—These rudimentary teeth, which are found in some horses but not in mares, and which have been supposed by ignorant persons to produce blindness, and other diseases, are entirely harmless, except for the abrasion they sometimes occasion to the tongue and cheeks. If they do so they are easily taken out by any sensible blacksmith. In fact it is quite well to extract them, not that they will produce serious disease, but simply because they are not of any value, are useless to the animal, and may occasion slight inconvenience.

7. Shying.—This is one of the most dangerous habits a horse can have, whether it be occasioned by cowardice—seldom the case; injudicious punishment—more common; or from defective eyesight, or from all these combined. If you are so unfortunate as to have a shying horse endeavor to break him of the vice by allowing him to examine objects of which he is afraid, by speaking soothingly to him, but never by whipping or spurring him. When he shows a disposition to shy turn his head to rather than from the object. Stop him; let him approach the object and touch it with his nose, for soon he will approach it himself. If simply caused by nervousness, he may thus be cured. If caused by being short sighted there is no means of relief. Before you buy a horse be certain that he has not this infirmity, as dangerous a one as it is disagreeable. Such an animal is only fit to be driven by the side of another horse who will keep him to his work, and upon which he at length will come to depend, or of being driven as a wheeler in a team of four horses.

CHAPTER XI.

HOW TO BUY, CONTINUED.

I. BUYING CHEAP HORSES.——II. COLOR, IN RELATION TO VALUE. —— III. ACTION. —— IV. FAST-WALKING HORSES. —— V. WHAT A HORSE SHOULD BE. —— VI. WHAT CONSTITUTES UNSOUNDNESS.—— VII. ILLUSTRATION OF FORM AND SYMMETRY.——VIII. THE BODY AND LIMBS.——IX. THE BODY AS STANDING FACING YOU.——X. FRONT VIEW OF FORE-QUARTERS, SHOWING DIFFERENT BAD CONFORMATIONS. —— XI. THE HIND-QUARTERS.——XII. THE VIEW FROM BEHIND.——XIII. WHAT NOT TO BUY.——XIV. BUYING FOR BLOOD.—— XV. SUMMING UP.

I. Buying Cheap Horses.

In the preceding chapter on this important subject we have endeavored to show some of the principal points to be considered in buying a horse, especially those relating to the use for which they are intended. There is one rule that will always apply in buying any horse. Never buy him because he is offered at a price evidently far below his worth, that is, except it be from a friend that you can trust, who does not want the horse himself, and wishes to do you a favor. These cases will be found very rare. In every other case rest assured the horse has some dangerous vice, or is permanently unsound. In this country never buy a horse at any price which has any appearance of broken knees by falling. Hunting horses are too rare here for one to have gotten the hurt in the field, and, accidentally, by being put at a barrier beyond his power.

Reject a horse with any weakness in his eyesight, unless you have use for a blind horse, then buy him at a blind horse's price. A one-eyed horse may do useful, but not elegant work. Never buy a lame horse at any price, until you are assured that the disability is not permanent.

Foot lameness, except it may be from a slight corn, and consequently

curable, should be an insuperable bar to purchase. You can never patch up a bad foot. Therefore be sure you always try the intended purchase on a hard road. Many game horses, dead lame on hard roads, will get along without much flinching on soft roads, or the turf. If you are certain as to the cause of the lameness and know you can cure it, the purchase, as a speculation, may do; but never rely on the assurance of the horse dealer. It is his business to sell.

Never buy a narrow chested horse for hard service. It shows weak lungs and those liable to inflammation. If for saddle, avoid a very broad chested horse, though as trotters they are sometimes fast. The best and most perfect chest is a medium between the narrow and broad chest.

A tucked up washy looking horse should be avoided. They may indeed do for light work or short drives, but are totally unfit for real work.

In buying avoid all defects in the wind; be sure the disability has not been temporarily covered up, by special means known to horse dealers. A whistler or roarer may show no indication of his infirmity at a slow pace, or up to a certain speed. Beyond that it is apparent. Broken wind is an incurable infirmity and probably as distressing to the horse as the asthma is to man. A horse may make more or less noise and yet not have broken wind. Any indication of this, however, is to be looked on with suspicion.

In buying a horse his points of excellence and infirmity are better shown if only in fair working condition than when very fat. A horse very fat is pretty nearly a useless creature until his condition has been brought down to that of bone, sinew and muscle, with just sufficient fat to lubricate, so to speak, the working parts. Yet a horse for slow draft may be serviceable and carry far more flesh and fat than one used for fast work. Many superior horses have been ruined by hard driving when fat, or soft.

II. Color in Relation to Value.

It is a saying as trite as it is old that any color is good in a good horse. Yet a horse, however good otherwise, should be invariably rejected if his color is bad. For instance, it would essentially mark both an ignorant and vulgar person who would select a piebald, spotted, or otherwise extraordinary color for a carriage horse. It would savor of the circus or show ring.

As saddle horses for gentlemen, self-colors are the best, and those distinct. A star in the forehead and two white feet behind give character. A snip in the face, if large, is objectionable. Four white stockings more so. Bay, brown and dark chestnut are the preferable colors. If the

horse is exceptionably stylish, black and dapple gray are good colors. Gray horses are often bad tempered, and black horses are not as a rule, docile. For ladies' use a dark cream color with white mane and tail, or that rare combination, a dark chestnut with darker tail and mane are elegant if of good form. So a strawberry roan, if unexceptionable in style and form, is elegant.

For single or double light driving, all distinct colors are good. Uneven or curiously marked horses are allowable in a fancy team—as a mismatch in distinct colors—as it is called. The colors should be distinct and in strong contrast, or else harmonious. A chestnut and a dark bay would be harmonious, and yet distinct colors. So would be a chestnut and a brown: a cream with white mane and tail, and a chestnut with dark mane and tail would show a marked contrast, and yet be elegant; so would be cream-colored horses so marked. A pure white and a jet black would be the most marked contrast possible, and not for a moment admissible, except both were faultless in form and style of going. Here in fact is where the fine art lies in teams of two distinct colors: *Whatever the mismatch in color, the team should be as near alike in form and carriage as possible.*

III. Action.

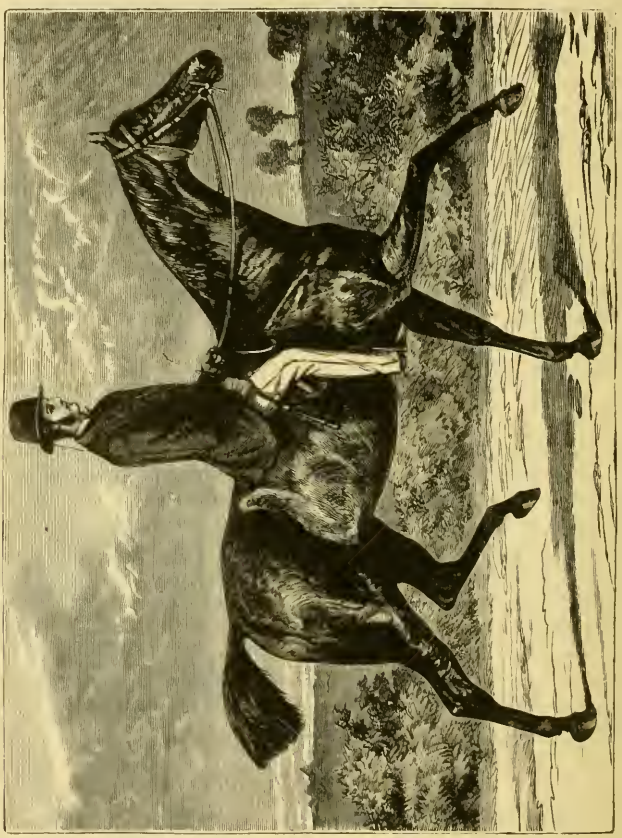
There are really but two styles of action: low, smooth, safe action, and high-stepping, showy action. The latter of little account except for parade and showing off on the road in connection with fine style. A high-stepping colt is as unsafe as he is ungainly. The action that is slow and safe, and fast and safe, if combined in an animal is invaluable.

A horse with really good action moves all his limbs evenly, and brings his hind legs well under him at every movement. Some horses with round action in front—paddlers they are called—are often staunch and sure-footed, but this is in spite of this action, not in consequence of it. Horses that straddle behind are often exceedingly fast trotters. Yet neither of these movements are what would be sought, either in a fine saddle horse or in a good harness horse.

IV. Fast-walking Horses.

We have before stated that a perfect and fast walking gait was not only indispensable to every horse, but the most valuable gait a horse could have for every day use. Yet we seldom see a horse that will walk four and a half or five miles an hour, even when urged and in regular 1–2–3–4 time, nodding his head harmoniously in cadence. If a purchaser gets such a horse, or one that will do four miles under the saddle with-

out stumbling, shuffling, dropping the step or breaking, be sure you have a good one at speed, if he has speed, for many great walkers are so broad chested that they cannot trot fast, and in galloping they will roll.



MOVEMENT IN WALKING.

Yet occasionally a horse will be found good at all gaits. When so, it is the result of exceptionably good form and careful training. He who can so train a horse may, if he finds the proper purchaser, get a long price for his trouble and skill.

V. What a Horse Should Be.

We have been very minute in stating the points of perfection in a horse, and have been particular in urging that the lungs, limbs and feet should be super-excellent. In addition, and as from one of the best authorities, we quote from the late H. W. Herbert, upon the physical structure of the horse, before illustrating physical perfection and perfect conformation. Mr. Herbert says:

"The points of the physical structure of a horse on which the most, indeed the whole of his utility depends, are his legs. Without his locomotors all the rest, however beautiful it may be, is nothing worth. Therefore, to these we look first. The fore-shoulder should be long, obliquely set, with a considerable slope, high in the withers and thin above. The upper arm should be very long and muscular, the knee broad, flat and bony, the shank, or cannon bone, as short as may be, flat, not round, with clean, firm sinews; the pastern joints moderately long and oblique, but not too much so, as the excess produces springiness and weakness; the hoofs firm, erect or deep, as opposed to flat, and the feet generally large and round. In the hind-legs the quarters should be large, powerful, broad when looked at in profile, and square and solid from behind. The hams should be sickle-shaped, not straight, and well let down, so as to bring the hocks well toward the ground. The hocks should be large and bony, straight, not angular and convexly curved in their posterior outlines: the shanks, corresponding to the cannon bones, short and flat, and the hind feet similar in form to the front. The back should be short above, from the point of the withers and shoulder-blade, which ought to run well back to the croup. The barrel should be round, and for a horse in which strength and quickness are looked to more than great speed and stride, closely ribbed up. A horse can scarcely be too deep from the tip of his shoulder to the intersection of his fore-leg—which is called the heart-place—or too wide in the chest, as room in these parts gives free play to the most important vitals. The form of the neck and setting on of the head are essential not only to the beauty of the animal, but to the facility and pleasure of riding or driving him; hence, with an ill-shaped, short, stubborn neck, or ill set on head, the animal cannot by any possibility be a pleasant-mouthed horse, or an easy one to manage. The neck should be moderately long, convexly arched above from the shoulders to the crest, thin where it joins the head, and so set on that when yielding to the bit it forms a semi-circle, like a bended bow, and brings the chin downward and inward until it nearly touches the chest. Horses so made are always manageable to the hand. The converse of this neck, which is concave above and stuck out at the

windpipe like a cock's wattle, is the worst possible form; and horses so made almost invariably throw up their heads at a pull, and the most exceptionable of brutes, *regular star-gazers*. The head should be rather small, bony, not beefy, in the jowl; broad between the eyes, and rather concave, or what is called basin-faced, than Roman-nosed, between the eyes and nostrils. The ears should be fine, small and pointed; the eyes large, clear and prominent, and the nostrils wide and well opened. A horse so framed cannot fail, if free from physical defects, constitutional disease and vice, to be a good one for any purpose—degree of strength, lightness and speed being weighed in accordance with the purpose for which he is desired."

VI. What Constitutes Unsoundness.

1.—*Spavin*, whether it be *bog spavin*, *blood spavin* or *bone spavin*, when sufficiently developed to be known.

2.—*Ossification* of any of the structures adjacent to any of the joints and also without doubt ossification of the lateral cartilages.

3.—*Corns* are considered as constituting unsoundness, but they must be discovered within a short time, say a few days of the purchase.

4.—*Curbs* constitute unsoundness, but they must be shown to exist at the time of the sale.

5.—*Founder* or *Laminitis*, is unsoundness whether it produces lameness or not, for if it has existed the laminæ will have been injured and the horse will be lame when worked.

6.—*Pumiced Foot* is unsoundness as evidence of laminitis.

7.—*Quittor* may render the horse permanently unsound.

8.—*Ring-bones* and side-bones constitute unsoundness.

9.—*A Nerved Horse* is unsound as showing the existence of disease for which the operation was performed, and also from the division of the nerves.

10.—*String-Halt* is unsoundness.

11.—*Thrush* is so when severe.

12.—*Breaking* down, even though the horse has recovered so as not to go lame.

13.—*Thickening of the Back Sinews*, or suspensory ligament, if known to exist, is unsoundness.

14.—*Broken Wind*, *Thick Wind*, *Whistling* and *Roaring* are all considered as constituting unsoundness, as forming impediments in breathing, injuring the animal for drawing or other active service.

15.—*Farcy and Glanders.*

16.—*Grease and Mange.*

17.—*Cough*, if it lasts. A horse with a chronic cough is clearly unsound.

18.—*Megriems*, if it can be shown that the horse has had an attack before the sale.

19.—*Ophthalmia*, if it occurs soon after the purchase. The evidence of a veterinary surgeon may be necessary to show the previous presence of the disease.

20.—*Cataract*, however slight, constitutes a horse unsound.

21.—*Broken knees*, when the joint is injured.

There are also vices for which a horse may be returned. These are:

1.—*Biting*, when clearly vicious.

2.—*Bolting*, or running away.

3.—*Crib-biting*.

4.—*Kicking*, when shown to be vicious.

5.—*Balking*.

6.—*Rearing*.

7.—*Shying*, when habitual.

8.—*Weaving in the stable;* that is, the horse throwing his head and body from side to side with a peculiar motion.

Definition of Unsoundness and Vice.

Unsoundness may be considered to be the existence of disease or alteration of structure sufficient to impair the natural usefulness of the horse. *Vice* may be defined as the prevalence of a habit which interferes with the natural usefulness of the horse. In unsoundness or vice, however, either must be marked, as for instance the following diseases or accidents would not constitute unsoundness:

1—Slight bog spavin; 2—broken knee, when the joint is not injured; *3—capped hocks*, or elbows; *4—contractions of the foot*, unless the result of disease, laming the horse; *5—curby hocks; 6—splints; 7—thorough pin*, and *8—thrush*, are not unsoundness in their incipient stage, or in a mild way. But the buyer should refuse all such except, perhaps, in the case of thrush. *9—Cutting* is not unsoundness, except the horse be lame at the time of sale, neither *10—soreness* of the joints from labor, or *11*, *windgalls*.

They are found often upon colts, but if the animal be lame reject him. When a horse is bought on warrantee, it must be written and concisely so. Do not allow verbiage to cause litigation. The following form will cover the whole ground:

Received.....(insert place and date) *of Mr*.....(insert name).....Dollars.....

for.....(describe horse or mare, and pedigree of same, if any).....*warranted*.....*years old*.....(state age).....*sound, free from vice, and quiet to ride or drive.*

When filled out this might read as follows:

Received, St. Louis, Mo., March 1st, 1880, of Mr. John Doe, five hundred dollars for a bay mare by Lancer, dam Lady, warranted five years old and under six years, sound, free from vice, and quiet to ride or drive. RICHARD ROE.

This with such careful examination as we have advised ought to insure any buyer against danger in case the seller is solvent.

VII. Illustrations of Form and Symmetry.

The head of the horse is the seat of intelligence, and to the conformation of the head we must look not only for intelligence but docility and courage, or the opposite character, as we must look to the teeth for indications of his age, to the nostrils as indicating his capacity for breathing, to the muzzle and jaw for indications of capacity and feeding, and to the eye and ear as showing fire, courage, and good temper.

Speed and bottom, which means the bone and muscle of good breeding whatever the family of the horse may be, is the *sine qua non* desired in a horse. His mission is labor, work of some kind, whether it be carrying a man on his back, or trotting to a wagon, or hauling a load through the mud. The head of the horse is, therefore, one of the first things to be looked at. The extract we have given a few pages back, from one of the most eminent writers of this country on the horse, will convey an idea of what a riding or driving horse should be. The nearer the horse for general utility, comes to the illustrations we give, the better he will be. The horse for heavy draft while being coarser, more stocky and heavier in his frame should conform to the general characteristics except that he should be more upright as to his shoulders, and not so flexible as to his limbs; then the better will he be. In fact one of the best draft horses we ever owned was a three parts bred Monmouth Eclipse, seventeen hands high, weighing 1250 lbs., pretty well up on legs, and those of exceeding flexibility. But when he got down to work he appeared to go close to the ground. This getting down to work—this getting close to the ground with the body, so every bone and sinew may exert the greatest possible leverage, is one of the fine arts of training. It really brings the oblique shoulder of the blood horse straight in the collar a possibility few horses have the knack of attaining naturally.

Explanation.— The illustrations we give on page 162 show a side and front view of heads of blooded horses, that may be taken as a type of what should constitute as near perfection as may be. Those on page 163, side and front views of heads are bad. By comparing them with the text the reader may form a good idea of characteristics. Observe in the side view, page 162, a fine head, tapering to muzzle, the chin, the prominent and yet bright, clear and soft eye, with a rather prominent brow; the shape and setting on of the ears; the strength of jaw, and at the same time its fineness; how the head is set on to the neck, and the fine, clean, muscular neck as well. In the front view observe especially the width between the eyes, the eyes being in fact apparently at the side of the head, and yet looking straight forward. Observe the cheek bones, widening and strengthening the lower part of the head; the temporal bones at the side of the eye; and the occipital bone at the top of the head between the ears. Especially observe the nostrils and lips as to flexibility and size. Turn back the folds at the end of the nostril, and it will be found you can look clear into the passage, showing a moist and healthy surface, or the reverse.

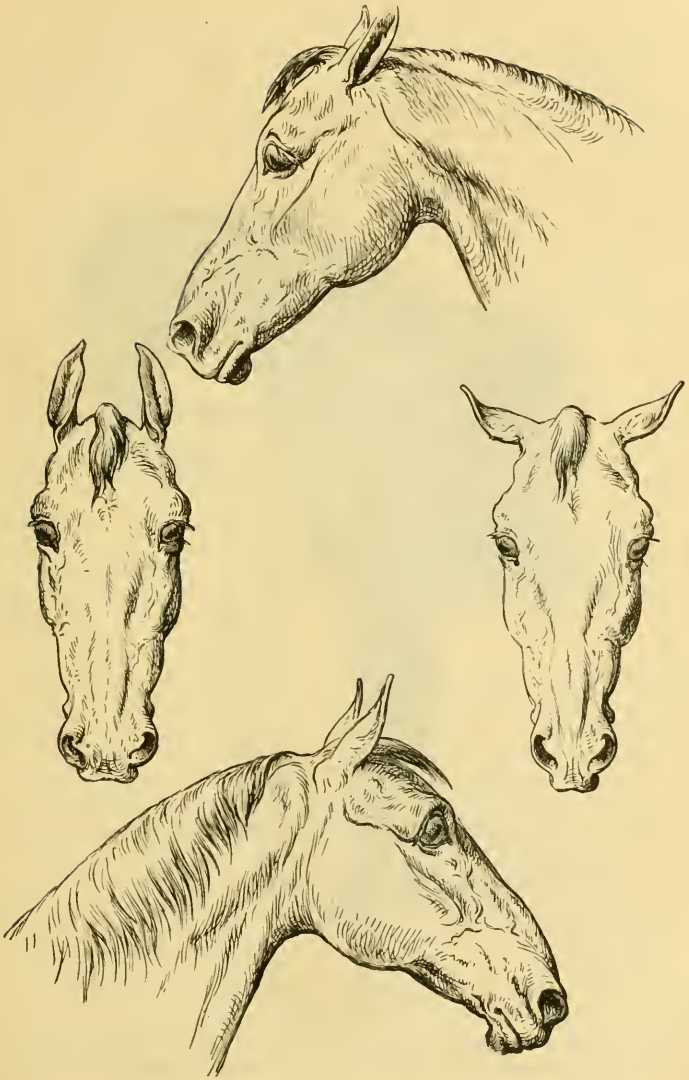
Let us now examine the side and front views of head on page 163. The side view at the top shows a head somewhat heavy in character, the nose and lower jaw thick to excess. Observe the peculiar formation of the nose. It is not the dish face of the first illustration, giving temper, accompanied with intelligent obedience. The eyebrows are prominent, the head broad, but the expression indicates not only fire but malice. The muzzle is that of a cruel horse, the intelligence that of self-will. The ears, although of good shape and breeding, are thrown back, and the head is set on at too great an angle with the neck.

The figure to the left shows the front view of a badly formed head. It will be noticed that it is of nearly the same width throughout. The eyes are placed very different from those of the front view of good head on page 162; too close together, and too much in front. The expression of the eye shows a stubborn disposition; the ears are good enough, but not held in that position of intelligent action as shown in the lower figure on page 162. They are pointed too close together.

The figure of the front part of a head to the right, on page 163, shows a head not badly formed, but the general expression of the face shows doltishness, and the drooping ears, and the expression of the eyes show not only a cruel but a stupid disposition.

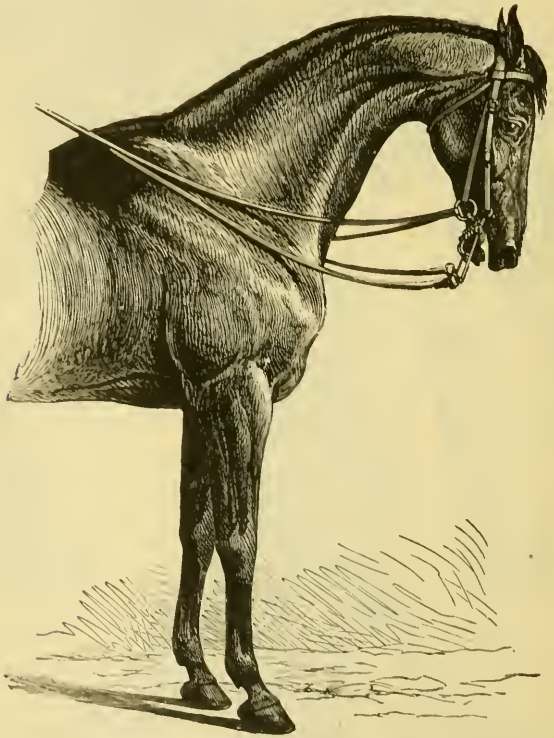
The lower side view of head and neck on same page shows a head indicating a horse that will not only be wild sometimes, but sulky; a self willed, obstinate brute, deficient in intelligence. The profile is curved, giving a Roman nose; the eyebrows are raised, giving the eye a wild

SIDE AND FRONT VIEW OF HEADS—GOOD (*See Explanation*).



SIDE AND FRONT VIEW OF HEADS—BAD. (*See Explanation*).

expression, and with the firm jaw, a stubborn character. Following the subject still farther, we may find all the gradations of character, including the exhibition of nervous timidity, fear, idiocy, and even insanity; for that there are horses subject to aberration, from mere hallucination to actual insanity, there is no doubt. The latter the most dangerous trait in a horse, since neither caresses nor punishment can cure.



SIDE VIEW OF FORE-QUARTERS, SHOWING A GOOD SHOULDER. (*See Explanation.*)

VIII. The Body and Limbs.

Explanation.—Following up the subject on pages 161, 162, and 163, we present side views, showing good and bad fore-quarters. The

first illustration shows as near perfection as may be in the shoulder for staunch qualities, good action and a fast walk. The neck muscular, but without superfluous flesh, but with plenty of substance where it joins the shoulder; the shoulder oblique and deep; the shoulder-blade high, helping to give stability to the withers; the breast prominent, but tapering down to where the legs come out of the body; the arm long, muscular, and yet tapering; the joints large, but yet firm and compact; the fetlocks of fair length and yet flexible; and the hoofs of good size, round, of good depth, tough and sound. An animal possessing the conformation as shown, will indicate a horse good for any purpose where speed and long continued powers of endurance are required. While the illustrations we give are perfect of their kind, and more valuable than any written description alone can be, yet the living animal must be studied, not only at rest, but in motion. The harness horse, however, need not have so oblique a shoulder as we have shown. In fact, few horses, even of the best class, do.

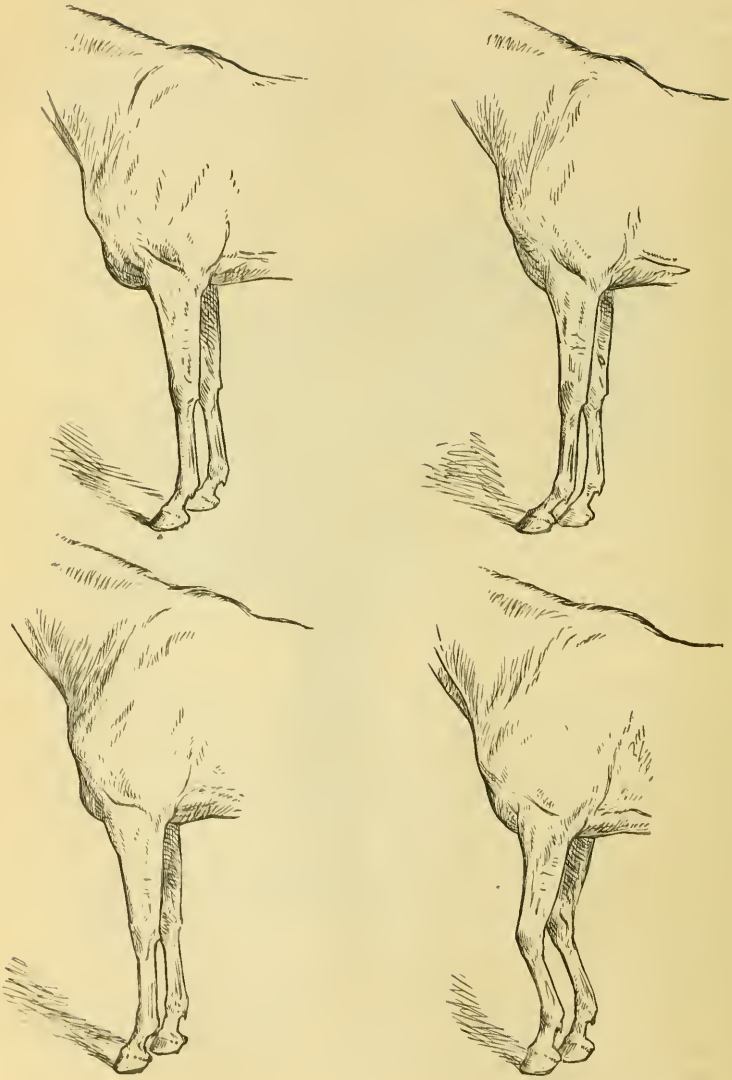
So the trotting gait, combining speed with high action and grand style might be considered vile in a saddle horse. In fact, the saddle horse should have a springy yet smooth motion, and except for show on the road, this will be found to be best for fast and easy work in harness. In practice much of this is often sacrificed, in pleasure horses, for the sake of mere style. The breeding of such horses is a fine art, often a costly one; yet those which fail in the style and action necessary to command the highest price as road and saddle horses, will be found to amply repay the breeding for the general purposes of the farm and for the road.

Explanation.—On page 166 are illustrations showing, the upper one, to the left, a straight shoulder, a heavy chest, and legs placed too far under. The arm seems longer than it is because it lacks muscularity; the shanks, while not positively weak, do not show due strength near the knee and pasterns, and are not as strong as they should be.

The upper figure, to the right, shows a shoulder as bad as the preceding one, and also weak legs and pasterns, the length from hoof to joint above being too great.

The left hand figure at bottom of same page, shows a shoulder fairly well placed, but with the legs set too much under, and the pasterns too straight. Such a conformation will give the horse the appearance of standing on the toes.

The lower figure to the right, shows what old age, hard work, abuse, or all combined, may bring any animal to, that originally may have been not only well bred, but of fair quality throughout. Watch for such limbs in buying, and avoid them.



SIDE VIEW OF FORE-QUARTERS, SHOWING BAD CONFORMATION. (*See Explanation*).

FRONT VIEW, SHOWING BREAST AND LIMBS—GOOD. (*See Explanation*).

IX. The Body as Standing Facing You.

The body of the horse viewed in front should present an oval shape, squared off from the arm or elbow joint in front to the point of the shoulder as on page 167. The perfect contour of breast, and especially the magnificent muscularity of the arm is near perfection. The neck rising grandly from the chest shows the perfect proportion of the parts each to the other; the knee and fetlock joints are strong and compact, gradually rounded to meet the shank or leg and bones of the pastern joint. The hoofs are staunch, tough, strong, with nothing about them to denote a flat foot, yet they will be found rather open behind, showing a perfect hoof.

Let us now examine the blood horse of the present day as quoted from Herbert, and also that of the ancient Greeks as written upon by Xenophon. It will show that in those days the breeding of horses was a fine art, as was also equestrianism as exhibited in the exquisite sculptures that have come down to us. Yet the quotation we make will show that the horse of the Greeks, useful and admirable as he was, was what the English would call a cab or Galloway, with a dash of thorough blood, and what we would call pony built with a dash of thorough blood—something in fact like a chunky Morgan horse. The quotation nevertheless will make a good study for the young horseman, and is as follows:

"We will write how one may be the least deceived in the purchase of horses. It is evident then that of the unbroken colt one must judge by the construction, since, if he have never been backed he will afford no very clear evidences of his spirit. Of his body then, we say it is necessary first to examine the feet, for as in a house it matters not how fine may be the superstructure if there be not sufficient foundations, so in a war horse there is no utility, no, not if he have all other points perfect but be badly footed. But in examining the feet, it is befitting first to look to the horny portion of the hoofs, for those horses which have the horn thick are far superior in their feet to those which have it thin. Nor will it be well if one fail next to observe whether the hoofs be upright, both before and behind, or low and flat to the ground; for high hoofs keep the frog at a distance from the earth, while the flat tread with equal pressure on the soft and hard parts of the foot, as is the case with bandy-legged men. And Simon justly observes that well footed horses can be known by their tramp, for the hollow hoof rings like a cymbal when it strikes the solid earth. But having begun from below, let us ascend to the other parts of the body. It is needful, then, that the parts above the hoofs and below the fetlocks (pasterns) be not too erect, like those of the goat; for legs of this kind being stiff and inflexible, are apt to jar the rider, and are more liable to inflammation. The bones must not,

however, be too low and springy, for in that case the fetlocks are liable to be abraded and wounded if the horse be galloped over clods or stones. The bones of the shank (cannon bones) should be thick, for these are the columns which support the body; but they should not have the veins and flesh thick likewise. For if they have when the horse shall be galloped over difficult ground they will necessarily be filled with blood, and will become varicose, so that the shanks will be thickened, and the skin be distended and relaxed from the bone; and, when this is the case it often follows that the back sinew gives way and renders the horse lame. But if the horse when in action bends his knees flexibly at a walk you may judge that he will have his legs flexible when in full career; for all horses as they increase in years increase in the flexibility of the knee. And flexible goers are esteemed highly, and with justice, for such horses are much less liable to blunder or stumble than those which have rigid, unbending joints. But if the arms, below the shoulder-blades, be thick and muscular they appear stronger and handsomer, as is the case also with a man. The breast also should be broad, as well for beauty as strength, and because it causes a handsomer action of the fore-legs, which do not then interfere but are carried well apart.

"Again, the neck ought not to be set on like that of a boar, horizontally from the chest; but, like that of a game cock, should be upright toward the chest, and slack toward the flexure; and the head being long should have a small and narrow jaw bone, so that the neck shall be in front of the rider, and that the eye shall look down at what is before the feet. A horse thus made will be the least likely to run violently away, even if he be very high spirited, for horses do not attempt to run away by bringing in but by throwing out their heads and necks. It is also very necessary to observe whether the mouth be fine and hard on both sides, or on one or the other. For horses which have not both jaws equally sensitive, are likely to be too hard mouthed on one side or the other. And it is better that a horse should have prominent than hollow eyes, for such an one will see to a greater distance. And widely opened nostrils are far better for respiration than narrow, and they give the horse a fiercer aspect; for when one stallion is enraged against another, or if he become angry while being ridden, he expands his nostrils to their full width. And the loftier the crest, and the smaller the ears the more horse-like and handsome is the head rendered; while lofty withers give the rider a surer seat, and produce a firmer adhesion between the body and shoulders.

"A double loin is also softer to sit upon and pleasanter to look upon than if it be single; and a deep side, rounded toward the belly, renders the horse easier to sit, and stronger and more easy to keep in condition; and the shorter and broader the loin, the more easily will the horse raise

his fore-quarters and collect his hind-quarters under him in going. These points, moreover, cause the belly to appear the smaller; which if it be large at once injures the appearance of the animal and renders him weaker and less manageable. The quarters should be broad and fleshy in order to correspond with the sides and chest, and, should they be entirely firm and solid they would be the lighter in the gallop, and the horse would be the speedier. But if he should have his buttocks separated under the tail by a broad line, with a wider space between them, and so doing he will have a prouder and stronger gait and action, and will in all respects be the better on them. A proof of which is to be had in men, who, when they desire to raise any thing from the ground attempt it by straddling their legs not by bringing them close together."

X. Front View of Fore-quarters, Showing Different Bad Conformations.

Explanation.—On page 171 the upper left hand figure shows the legs fair to the knee, but from thence down, bad, and with toes turned very much out.

The next figure on the left, is very bad, the knees turned out and the toes turned in; a dangerous horse, and unfit for driving or riding.

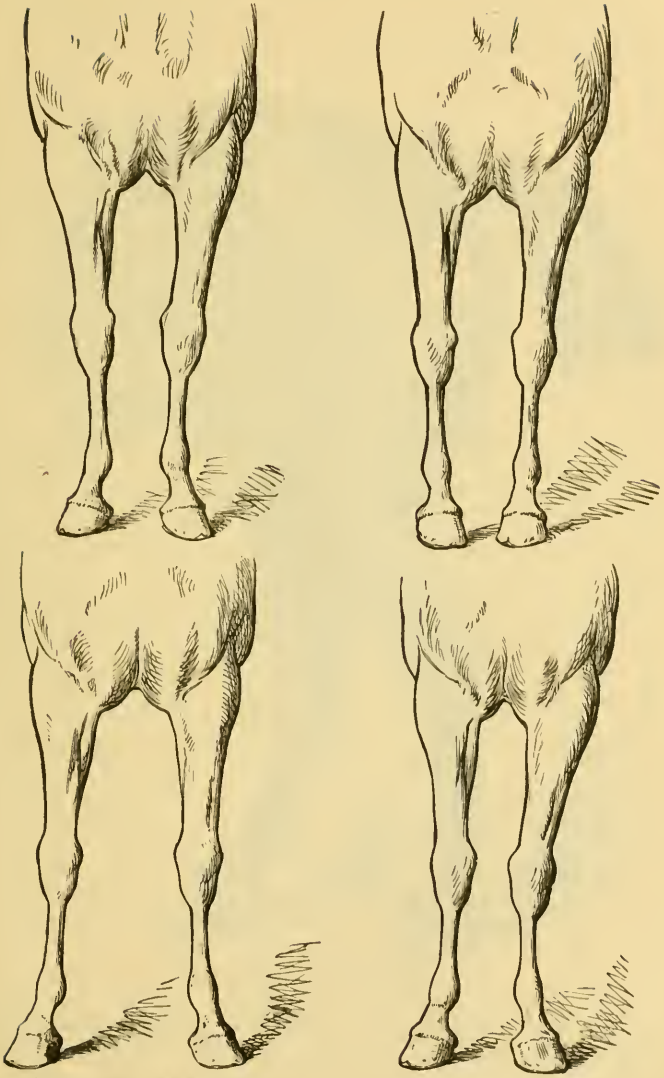
The lower figure to the left is as unsightly as possible; the legs spready, weak, straddling, and with the toes turned out. Such a horse may be tolerably sure-footed, if carefully managed, and not hard-driven, but one never to be depended upon.

The next figure at right of bottom, is bad all over, weak-limbed, knock-kneed and splay-footed. A horse never to be depended upon and unserviceable in the extreme.

Between these there are many gradations, which those who study these pages may profit by examining and comparing with the front view of a perfect shape given on page 167, and which carried fully in mind will go a great way in enabling one to form a pretty accurate opinion in buying a horse.

XI. The Hind-quarters.

It has been said that the fore-quarters of a horse are simply to hold him up, while the hind-quarters propel the machine. This in a sense is true, but a horse, however good his hind-quarters be, must not only have the fore limbs good enough to hold him up, but to keep him out of the way of the hind feet, and at the same time assist in propelling the body. In fact, the whole animal should be composed of parts working harmoniously together, each assisting the other while doing its own work;



FRONT VIEW OF FORE-QUARTERS, SHOWING DIFFERENT BAD CONFORMATIONS.

nevertheless the hind-quarters are the propelling power, especially when under the gallop. For then the motion is communicated by a succession of leaps, acting more in the nature of a balance than in walking or in

GOOD HIND-QUARTERS. (*See Explanation.*)

trotting. In order that the hind-quarters may do their work effectively, there must be a strong loin, ample and muscular quarters, great length

of hip, strong, dense bones, sinews like whip-cord, strong joints and flat and wide legs.

In order to determine this the purchaser should observe first, looking at him from the side, whether he stands resting perpendicularly on every leg alike. The legs should not be straddled outside of their true position, neither should they be gathered together, or in horse-men's phrase, as though he were trying to stand in a half bushel. He should stand straight, square, and distinctly on every leg. If he stands with the hind legs behind their true position, induce him to move his fore legs forward, to find if such a position gives him ease. Examine him as before stated for splints, damaged back sinews, ring-bones or side-bones in the fore limbs; and in the hinder ones for bone blood or bog spavins, curbs or thorough pin, as previously described. If he stands as in the figure given on page 172, and if he is free from blemish, one may go a long way to find a better.

Examine especially whether the pasterns, outline of the hock joints, are nearly perpendicular or angular, or whether they present a convex curvilinear protuberance just above the union of the shank bone. If not there will be little danger of curb, or a tendency to throw them out. If the hocks are drawn in the horse will appear cow-hocked, a malformation as serious as it is ungainly, for thus the animal will be weak. If the hind-legs are wide apart and the horse straddles in going forward, while it may not weaken his stride it is not elegant. However true it be that some fast and strong trotters straddle—as going wide is termed—this should be avoided. The illustration on page 172 will show accurately good hind-quarters, as those on page 174 will show bad ones.

On page 174 the figure at the upper left side would be called fine and in every way good to the inexperienced buyer. The buttocks are round but lack character, and the legs are too straight and far behind.

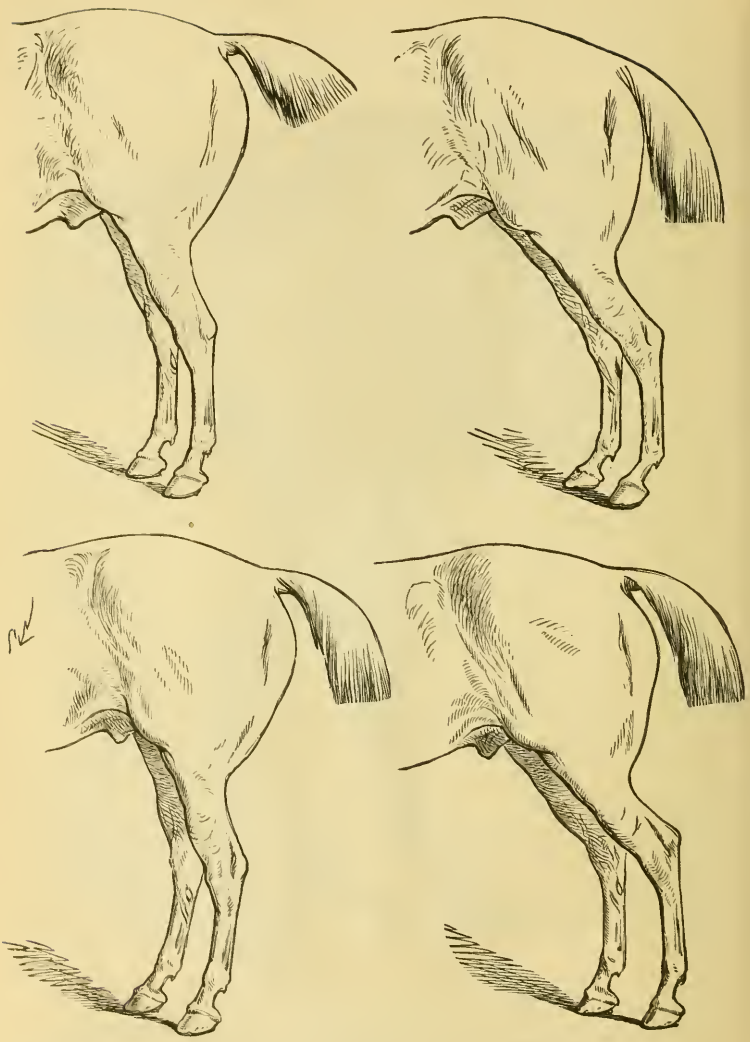
The figure to the right is bad in every respect—goose-rumped, cat-hammed, with the legs thrown far back to equalize the strain; the ankles also weak.

The figure to the lower left on same page shows a fair quarter, but the legs are thrown too far forward, and the animal stands too straight on the pasterns.

The figure to the right is really not badly formed as to the quarter, but the position is cramped and bent, and the limbs badly placed.

XII. The View from Behind.

The view of the horse as seen from behind should show good square quarters, full and perfectly shaped *gracilis*, as those muscles are called

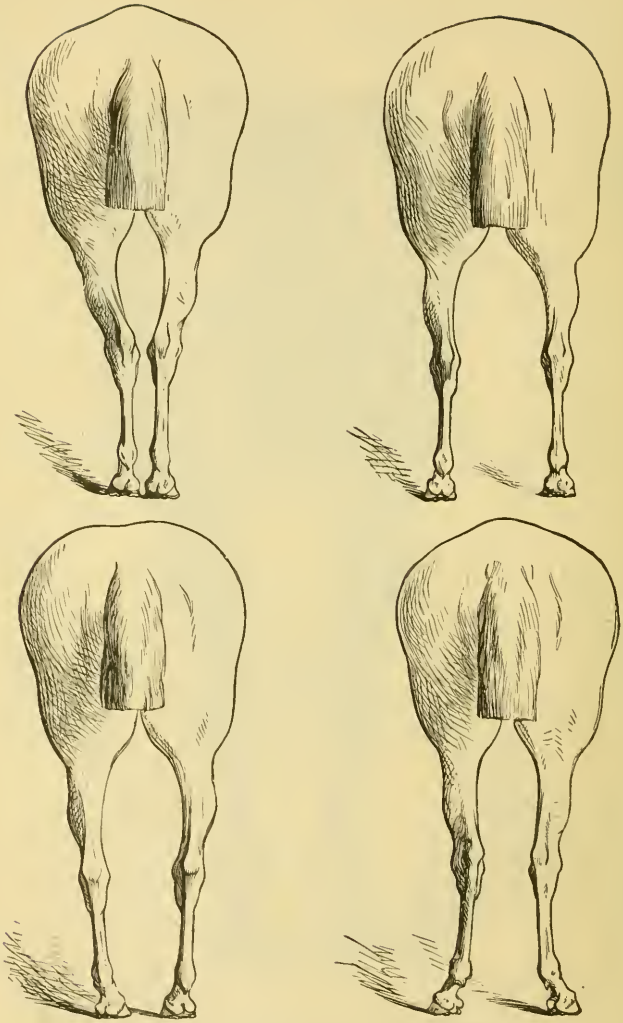


SIDE VIEW OF HIND QUARTERS—BAD. (*See Explanation*).

which give the peculiar swelling shape to the inside of thigh. These should be egg-shaped, or rather should swell from nearly a point below and then gradually decrease in size till lost to view near the rump bone.

BACK VIEW OF HIND QUARTERS—GOOD. (*See Explanation*).

The outside muscle of the tibia, or great bone of the leg above the knee, cannot well be too large. The tendons connecting with the hocks



BACK VIEW OF HIND-QUARTERS—BAD. (See Explanation).

should be strong and well presented to view. The hocks large, firm, strong and well knit, but smooth and free from blemish, as should be the fetlock joints. If the horse is flat-footed he has a weak hoof, which should never go with a strong muscular horse.

When the animal moves forward, observe that the feet are lifted squarely, carried straight forward, without turning or straddling. If so, and the conformation is as presented in the rear view of the horse on page 175, then if you have attended minutely to the other directions, and the movement is satisfactory, you need not fear to buy the horse. He will not fail you in time of need.

As showing defects, in various gradations and malformation in the hind-quarters, we refer the reader to the figures on page 176, a study of which will enable the observer to steer clear of splay-footed, pigeon-toed, bow-legged or cow-hocked brutes.

XIII. What Not to Buy.

Never buy a horse unbroken or half broken, unless you are thoroughly competent to train him, or else have some one to do so on whom you can depend. Never buy a horse overloaded with fat, expecting him to remain so under work. The first thing to be done with such a horse is to get him rid of the superfluous fat and water. This takes time and takes money. Besides you never can know the real defects of a horse "very fat." An ox or a hog perfectly fattened, is pleasing to the eye. They are intended for succulent joints and steaks, or for hams, bacon, or pickled pork. A fat horse, except before the close coach of some wealthy and aged spinster or widow, is woefully out of place.

Never buy a horse because he is big, unless you want him for slow and heavy draft. Light horses are for light driving. A horse weighing eleven hundred is heavy enough for ordinary driving, and generally better than a heavier one. A pair of horses weighing twenty-four hundred pounds is good enough for any ordinary work that comes, and heavy enough for any city teaming, except when wanted as show horses before some brewer's wagon, or as horses of slow draft on heavy trucks.

Don't buy a cheap horse, expecting perfection. The two never yet went together. Perfect horses are not so plenty. Indeed they are so scarce as to be entirely beyond the means of any except the very wealthy. They are seldom seen even among this class. In fact perfection lies only in degree. A horse may be measurably perfect for our purpose, and yet quite defective for others. Therefore buy a horse for what you want, and expect to pay the honest price for what you get. Again, unless you

are a judge, buy of some dealer who has a reputation to lose, and the means to back up any guarantee he may make.

XIV. Buying for Blood.

In buying for fast work, buy blood every time, whether the work desired is to be trotting to the wagon or carrying the owner under the saddle.

In buying blood, as a breeder, whether stallion or mare, never fool away any money on a half or three-quarters bred sire, expecting to get high caste horses. With a staunch thorough-bred of trotting action, you may successfully breed good trotters and workers on mares of cold blood, if they be of good size and form and are roomy. But for racing do not expect a cold-blooded mare to bring a very fast one, however good the size, except it may be by chance, and a rare chance at that.

In breeding for any purpose select the best of the class. Staunch thorough-breds for fast work; handsome thorough-breds for show horses.

For draft select from families that have been bred for generations for this work. Above all do not buy horses and mares that happen to strike your fancy, expecting to start a *new breed*. Life would be all too short. It would be far more sensible to begin where the last man left off.

XV. Summing Up.

From the foregoing the reader may arrive at pretty correct ideas as to what a horse really should be if he carefully study and make himself familiar with horses by examining the living subjects, and comparing with what we have written and illustrated. As a rule neither the farmer nor the breeder is thoroughly grounded in what constitutes excellence in the horse, and especially are they deficient as to what constitutes soundness and unsoundness. In the same manner are they ignorant as to what will naturally give speed and endurance in an animal. It is true there are exceptions, but they are comparatively rare. Yet, supposing they know all about it they will often pronounce a horse sound, or well broken to saddle and harness when he is manifestly neither one nor the other. Therefore the intending buyer, if he be not himself fully informed from actual experience, must not suppose that either of these classes necessarily know the real merits or defects of an animal. It has caused endless litigations in our courts, and will cause many more until those who breed take the pains to fully ground themselves in this, among the most important branches of the professional breeder.

To become a perfect judge of a horse, from what one naturally learns from his own observation, unless he study carefully, may truly be called

an impossibility. As a means of educating, books are written. If the experience of experts and quotations from the best and latest authorities, given in this work, shall induce a more careful study by those into whose hands the book may pass, it will, on the one hand go far to rid the trade of mere jockeys and horse "dopers," who daily palm off the most worthless brutes by a glib use of a centrally-hinged tongue. It will do more. It will disseminate a more perfect knowledge of what a horse should be among farmers who seek to breed one, two or three colts a year, by showing not only the necessity of good blood, whatever the style of the horse they intend to breed, but it is hoped also that it may lead to a higher appreciation of that noblest and best of the four-footed servants of man, a well bred horse.

PART II.

DISEASES OF THE HORSE;

THEIR CAUSES, HOW TO PREVENT, HOW TO KNOW AND HOW TO CURE.

Diseases of the Horse.

THEIR CAUSES; HOW TO KNOW, AND HOW TO CURE THEM.

CHAPTER I.

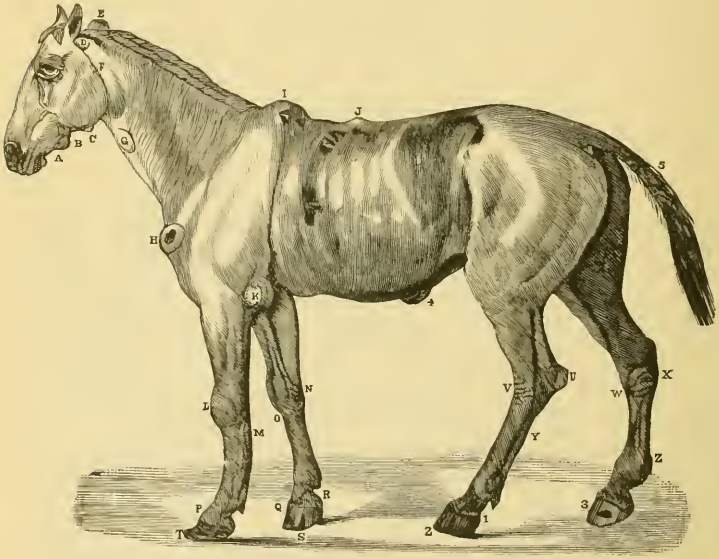
I. INTRODUCTION.—II. EXTERNAL MANIFESTATION OF DISEASE.

I. Introduction.

The various diseases to which the horse is subject, embrace nearly all those afflicting the human family, and including among them, as most common, diseases of the skin and its integuments, those of the muscles, of the ligaments, and of the bones, quite rare in the human family, and to which the horse might be completely exempt, were it not for the ignorance, and in very many cases the brutality of the master in over-driving, over-weighting, leaping, beating, neglect in clothing when heated, carelessness in grooming, want of proper ventilation in stables, and the withholding of proper and sufficient food. Take away these causes of disease and the labors of the veterinary surgeon would be light. We should see but little of caries of the bones, causing degeneration of the substance; of spavin, curb, ringbone, splint; of injuries to the sinews and tendons, causing breaking down; swellings and other of the most serious afflictions; poll evil and other fistulous diseases; of fractures; of rheumatism; founder, including grease, inflamed glands and veins, cracks of the hoofs, quittor, hernia, and all that class of diseases attacking the faithful servant of man, and henceforth rendering him useless for the purposes of pleasure or profitable labor. Instead of ending the sufferings of the tortured animal by mercifully taking its life, many owners for the sake of the few paltry dollars received, transfer the once favorite steed

to some one else equally inhuman, who thenceforth drives and goads the sufferer to labor under the most torturing circumstances, until the animal economy, entirely disorganized, perhaps by years of such unmitigated torture, drops and dies.

The object of this treatise is to so enlighten the horse owner in the nature of disease as to enable him to determine whether treatment can be made effective—if so, *what to do;* and especially is it the purpose to so acquaint him with the *causes*, that occasion for treatment may be averted. By a study of the facts we give it may be easily known whether cure is possible, and if not it is more merciful to kill and end the misery of the poor animal.



EXTERNAL MANIFESTATIONS OF SOME DISEASES OF THE HORSE.

II. External Manifestation of Disease.

For all the diseases we have mentioned but little medicine is needed. Rest and nursing are most needed—often months of rest and care, as in the case of spavin, commencing in inflammation and ending in the deposition of bony matter, stiffening of the joint, or, as in the case of exostosis of the heads of the bones, they in time become quite anchylosed,

when lameness ceases from the suspension of action of the joints caused by their complete solidification or growing together.

That the reader may form a more correct idea of what we here write, and have it brought plainly to view, we present an illustration of some of the principal diseases of the bones and tissues, caused generally by abuse, with a short description of their origin. The treatment will be given in the proper place.

A—Caries of the Jaw. Ulceration of the lower jaw, sometimes ends in mortification. Caused by bruises from barbarous bits and curb chains.

B—Fistula of the Parotid Duct. Fistulas are caused by bruises or undue compression of the parts producing inflammation and abscess.

C—Bony Excrescence. (Exostosis of the jaw). A blow upon a bone will produce inflammation followed by exostosis (bony growth through increased nutrition)—that of the joints being fearfully painful.

D—Swelling by pressure of the bridle, causing inflammation, and sometimes tumors.

E—Poll Evil. A painful fistulous disease, often difficult to cure.

F—Inflamed Parotid Gland. Caused by a bruise or compression.

G—Inflamed Jugular Vein, caused in various ways, often by carelessness after bleeding.

H—Fungus Tumor, from compression of the collar. The result of galls and subsequent want of care, and inattention.

I—Fistula of the Withers, caused generally by pressure of the saddle.

J—Saddle Gall, caused by a bad fitting saddle; sometimes ending in sitfasts.

K—Tumor of the Elbow, caused generally by interference of the shoe in lying down; sometimes by a blow.

L—Induration of the Knee, caused by blows in falling.

M—Clap of the Back Sinews, caused by severe exertion in running and leaping, destroying the integrity of the sinews of the leg.

N—Mallenders, scurfy manifestations at flexions of the knee, sometimes becoming cracked and itchy.

O—Splint, caused by blows, kicks, etc., on the shins. They are to be dreaded as interfering with the action of the sinews.

P—Ringbone, caused by starting heavy loads, or excessive pulling in going up hill.

Q—Tread upon the Coronet, the contusion of the shoe of one foot by treading on the other, causing laceration of the coronet and of the horn of the hoof.

R—Quittor, confined pus, from prick of the sole, corns, or injury to coronet.

S—Quarter Sand Crack. Imperfect secretion caused by dryness of the hoof; rupture of the laminæ.

T—Contracted Hoof, or ringed hoof of a foundered horse. The result of Laminatis.

U—Capped Hock. Injuring the point of the hock.

V—Sallenders. Scurfy eruptions on the seat of flexion of the hock. Similar to mallenders.

W—Spavin. Inflammation causing painful bony enlargement, sometimes stiff joint. Caused by blows, slipping and hard work, often from weak limbs.

X—Curb. Inflammation and lameness of the posterior part of the hock, ending in bony formation. Caused by wrenching or straining the limb.

Y—Swelled Sinews, caused by strains or bruises, producing inflammation, and ending in enlargement.

Z—Thick Leg, caused by various injuries to the joint. Any inflammation may result in a thickening of the integuments. In all inflammatory difficulties of this nature, including, spavin, curb, etc., cold water faithfully applied at the outset will be indicated, but often the trouble is not known until too late for cold water. The warm water fomentations will then be indicated. [See treatment].

1—Grease, caused by debility, excessive labor and neglect, filthy surroundings, from stoppage of the secretions. Scratches are from the same cause, as working in the mud without proper cleaning, etc.

2—Toe Sand Crack, caused by the same difficulty as quarter sand crack.

3—Quarter Crack. [See sand crack].

These are occasioned generally by severe labor of animals not strong in the feet, by which the walls are ruptured, by breaking the hoof with the calk of another foot. False quarter is occasioned by the absence of the outside and harder portion of the hoof.

4—Ventral Hernia. Rupture by which the bowel lies next the skin. When hernia is accompanied with strangulation it becomes dangerous.

5—Rat Tail, loss of the hair of the tail.

Fuller facts as to causes and treatment of these disorders will be found in the appropriate place in this work.

CHAPTER II.

DISEASES OF THE SKIN AND SUB-CUTANEOUS TISSUES.

I. SCRATCHES. ——II. GREASE.——III. THRUSH. —— IV. SWELLED ANKLES. —— V. SWELLED LEGS. —— VI. SURFEIT.——VII. MANGE.——VIII. RING-WORM.——IX. HIDE-BOUND. —— X. SADDLE GALLS, OR SITFASTS. —— XI. FUNGOUS COLLAR TUMOR.——XII. WARTS.——XIII. VERMIN. —— XIV. LARVA IN THE SKIN.—— XV. TETTER.——XVI. RAT-TAILS.——XVII. MALLENDERS AND SALLENDERS.—— XVIII. POLL EVIL.——XIX. FISTULA.

Of skin diseases there are two classes: those resulting from neglect and general bad treatment, and those due to disorders of the internal organs with which the skin is in sympathy, or which inflame it by unnatural excretions or irritants in the blood. It is almost impossible perfectly to classify them, since even some that are generally considered to arise from constitutional causes may be produced by external circumstances, and the reverse.

In the following sections we treat the most important of both classes. Others of less moment will be found in our chapter entitled "Miscellaneous Matters and Suggestions, Minor Disorders, etc."

I. Scratches.

Causes.—These are various; as, clipping the heels, which is sometimes done, and thus destroying nature's covering, so as to allow the parts to become chilled; washing off the legs with soap and water without subsequently thoroughly drying them, and then suffering them to be exposed to cold air; standing in snow or snow-slush; standing in or upon hot and steaming manure of any kind, while in stable; or being long in mud and filth while in service and not subsequently carefully cleaned. Anything that will produce inflammation of the skin of the heel, or in any way weaken it, may produce scratches.

As is the case with other local disorders, this is most easily and rapidly

developed when the horse is not in a condition of good general health; but foul stables, while furnishing the irritating filth immediately to the seat of this disease vitiate the air also, and thus tend to bring about a two-fold trouble.

It is believed to be sometimes due to the existence on the skin of parasitic plants and insects.

The sure *preventive* is to keep the horse, if possible, in good general condition; and to confine him, when he must be confined at all, only in a dry, clean, and well-ventilated stall. When he is forced to be worked during the day in mud or slush he should be neither stabled nor turned to pasture until feet and legs are well washed and thoroughly dried.

How to know it.—Scratches are said to be unknown to European horsemen; but it is so well known in the United States as to render a description well nigh unnecessary. It appears on the back part of the foot, generally of the hind foot; and extends from the heel to the fetlock. It has been known entirely to encircle the foot, and to extend upward to the hock and to the knee. The parts are sometimes hot, swollen and sensitive before any cracking or ulceration takes place; then they become dry and scaly, and crack open by ordinary motion. A horse thus affected is apt to manifest a disposition to walk stiffly, with his hind legs, (when the disease is seated in the hind heels), wider apart than ordinary, and to throw his foot rather violently forward when an effort is made to examine it.

It is often the case that at first there are little patches of a thick, dry, scabby covering of the skin; and these spread and inflame until they form a solid mass of scab and matted hair. These scabs may be distinguished from those which sometimes appear in other skin diseases by this, that they have an unusual itchiness, which leads the horse to rub them as much as possible; and he often does this until they bleed and become raw. This disposition of the suffering creature to scratch himself is said to have originated the name by which the disease is known.

What to do.—In cases where the patient is in good condition, and the disease is in its incipient stage, a thorough cleansing of the parts with castile soap and warm water, and applying an emollient or softening poultice for a day or two, with rest, will be sufficient. If there seems to be feverishness of the system, a dose or two of Epsom salts to move the bowels, given in doses of from one to three ounces at a time, will be beneficial.

The following is for ordinary cases a most efficacious and easily used remedy:

No. 1.

¼ Oz. powdered gum camphor,
1 Oz. gum myrrh,
1 Fluid oz. sulphuric acid,
1 Fluid oz. spirits of turpentine,
1 Pint of lard.

Mix thoroughly, and rub the ointment well upon the heels once a day. The legs and feet should be washed with soap suds before every application.

When the disease is chronic, and proud flesh has appeared, make a poultice of ground flax seed and lime-water; sprinkle burnt alum over the poultice, and apply. Use two or three poultices a day until the proud flesh has evidently disappeared, then use the ointment No. 1 as above directed.

Another course of treatment, to be adopted when there is a disordered condition of general health, and evidences of vitiated blood are manifested, is this:

First bleed; but observe to regulate the quantity of blood drawn by the condition of the animal as to flesh and strength. If he is poor and weak, take from the neck vein about three pints, and after nine days a like quantity. If he is plainly in poor general health, but not reduced in flesh and still strong, bleed once, taking from the neck vein three quarts. Then make careful and thorough application of ointment No. 1.

It may well be stated here that in our practice we do not often resort to bleeding, nor do we recommend it except in rare cases. To the man, however, who finds it both profitable and agreeable to be his own stock doctor it is often the quickest, easiest, and safest means of removing vitrious humors, and bringing about a more natural and healthful circulation. In some acute diseases of violent character, as pleurisy, mad staggers, and the like, it is frequently of the first importance, sometimes almost the only hope; but we would caution the reader against the indiscriminate blood-letting of the old practitioners. Observe well the symptoms; consult this department of "The Stock Doctor" carefully; and you will not fall into the mistake of taking away gallons of blood when a little rest, some good grooming, and plenty of nutritious, life-giving food, are the things mostly required. The manner of blood-letting will be found to have been treated of in our chapter entitled "Implements: what to keep and how to use."

The foregoing methods will answer in all ordinary cases; but if the patient has not been taken in hand till the disease has become chronic and obstinate, the following is a most excellent preparation and may be used instead of No. 1. It requires care in the using, as it will discolor the hands and corrode the nails if it comes in contact with them, and it should never be entrusted to bungling and inconsiderate grooms; but in

the hands of careful horsemen it is a most valuable remedy for all obstinate wounds, bruises, galls, tumors, and sores. We shall refer to it in subsequent portions of the work as *camphorated corrosive sublimate* or

No. 2. 1 Pint spirits of turpentine,
1 Oz. finely pulverized corrosive sublimate,
1 Oz. gum camphor.

Have the corrosive sublimate very finely ground in a druggist's mortar, (the efficacy of the compound depends much upon this); pulverize the gum camphor; put all together into a good strong bottle, and shake thoroughly. Then let it stand for at least twenty-four hours—longer would be better, as it becomes more and more valuable with age and repeated shakings—and it will do to use. In applying it, saturate a small mop, made of soft rags, neatly and firmly tied upon a stick. Wash before making first application of No. 2, but afterwards, unless the foot becomes very foul, this need not be done. The liniment should be applied once a day till cure is effected.

Keep the horse out of the wet during treatment, especially if the camphorated corrosive sublimate is used. See to it, also, that his stable is not only dry, but airy. If it is pasture time, he will need no other food than grass, unless it is found necessary to stable him, to keep him from rains and dews. In any event, he ought to be fed rather lightly at first, and with food not calculated to inflame. If the time is Winter give as much green, soft food as can be conveniently had, such as roots, chops, etc.

II. Grease, or Cracked Heels.

Causes.—This disease is but a modification of scratches and of thrush—partaking more of the nature of thrush, however, than of scratches, as it is confined almost exclusively to the heel, the seat of the thrush, which is seldom attacked by the scratches.

It is occasionally the result of constitutional weakness or derangement. When the system abounds in morbid matter, its tendency is towards the heels, and debility is felt in the distended vessels remote from the vital organs, ending in inflammation of the skin of the heels, distension of the sebaceous glands, a stinking deposit on the surface, and a purulent discharge through cracks.

Cutting away the hair of the fetlock, and thus exposing to sudden and protracted cold the parts which it is designed to protect, often causes this affection, even in animals of otherwise good condition.

Frequently, however, it may be regarded as most probably a secondary disease, originating in some other, which has resulted from careless or inhuman treatment, or from constitutional weakness.

It is not contagious; but filth and want of attention will produce it in nearly all horses similarly subjected to their influences.

How to know it.—It manifests nearly the very same symptoms as thrush, as given in the following section; but there is one striking peculiarity which distinguishes it from thrush, foot-evil, and other disorders of that kind—*the heel cracks open*. In a healthy state, the heel of the horse is moistened, and so kept from becoming dry and hard, by a constant secretion and discharge of an oily fluid from the cellular tissues under the skin. When this is obstructed, the skin becomes dry and feverish, and looks scurfy and hot. It soon thereafter cracks, and the pent-up oily secretion, now turned to a foul, yellowish water, flows out. As the flow of matter increases, it becomes more and more thick, stickey, and stinking; and if not attended to, the heel and sides of the foot become a mass of ulcerated excrescenses.

It sometimes manifests itself by the oozing out of a thin matter through the pores of the skin from some deep-seated disease of either the coffin-bone or the navicular joint — most frequently the latter. The more effective treatment in this case would of course be that directed to the healing of the primary disorder.

First Stage of Confirmed Grease Exudation.

What to do.—The treatment necessary is similar to that for scratches. In the first place, see to it that the causes which have induced it shall no longer operate. If the disease is secondary, it must be somewhat difficult to manage; and the animal should be allowed to rest, taking only such exercise as nature prompts, in an open pasture, except in bad weather. When it is necessary to confine him, give him a good stable, dry litter, and pure air. Remember that rest is one of the first conditions of success; while constant driving or any other labor will most probably defeat the ends of the physician.

Second Stage of Confirmed Grease Cracks.

If the disease is discovered in its early stage, and the general health of the animal has not suffered, cleanse the parts well with tepid water and castile soap, and make occasional applications of No. 2, or the camphorated corrosive sublimate, say once a day, till a cure is effected. A few applications will generally be found sufficient.

If the horse is thin in flesh, and in a low state of health from the effects of this disease, mix sulphur and rosin, in the proportion of two

parts of the former to one of the latter, and give him a quarter of a pound of this every third day until he has taken three or four doses. Meanwhile, thoroughly saturate the parts at least every other day with No. 2 till the disease is thoroughly conquered.

If the liniment forms a scab upon the heel, so hard and dry that the remedial effects seem to cease, omit the liniment for several days and keep the heel well greased. The scab will come off, and then the application of the liniment, (No. 2), may be resumed. This course must be persevered in till a cure is effected.

The liniment should be applied at night; and the horse should not be turned into pasture when the grass is wet with dew or rain—at any rate, not till six hours after the application has been made.

In Summer, pasturage will in general afford sufficient food: but in Winter it should be more nourishing, yet green and succulent as far as possible. Roots and good bran mashes ought to be given in reasonable quantity. Grain, as a regular diet in this case, is objectionable, on account of its tendency to produce inflammation.

After three doses of the sulphur and rosin have been given, as directed, the following mixture, given every night until all traces of the active disease have disappeared, will be found an excellent tonic or strengthening medicine, and having the effect, too, of giving healthy tone to the skin:

No. 3.
½ Oz. liquor of arsenicalis,
1 Oz. tincture of muriate of iron,
½ Pint of water.

This constitutes a dose. Mix and give as a drench.

When it is difficult to procure No. 2, the following may be prepared and substituted therefor:

No. 4.
8 Oz. tar,
1 Oz. beeswax,
1 Oz. rosin,
1 Oz. alum,
1 Oz. tallow,
1 Oz. sulphate of iron,
1 Drachm carbolic acid.

Mix, and boil over a slow fire, stirring as long as dirty scum appears, and then add 2 oz. of the scrapings of sweet elder.

III. Thrush.

Causes.—This, like scratches, results for the most part from foul stables,—the horses being forced to stand in mortar of dung and urine,—or from working in muddy and filthy places, without having his feet and legs well cleansed when he is unharnessed for the night.

It is sometimes caused by injuries to the frog of the foot, as bruising, snagging, and improper shoeing.

It may arise also from a gross habit of body, producing inflammation of the sensitive frog, when a spongy substance is deposited instead of sound horn; and this breaks away and leaves the frog ragged and tender.

Again, it may come from too frequently stopping soft frogs with cow dung, as is the practice of some grooms, thus encouraging rather than curing decomposition.

Lastly, it may be secondary, having resulted from other diseases, superinduced by want of cleanliness and care.

How to Know It.—In some cases, the only means of detecting the existence of thrush is a peculiar smell, or by very careful examination, as the hoof may show no change, and the frog may not be tender. In this case the cleft of the frog will generally be found lengthened and deepened, the opening extending to the sensitive horn within, and this, when thus closely observed, shows discharge of matter.

The progress of the disease is often slow, though showing meanwhile no disposition to heal; till after awhile the frog begins to contract, becomes tender, grows rough and brittle, and emits a more offensive discharge. The horny part disappears, and a hardened substance takes its place; this easily scales off and leaves the sensitive frog uncovered.

In its advanced state, it is very easily detected, as it is characterized by a continuous discharge of offensive matter from the cleft of the frog. If not reasonably attended to, proud flesh sprouts up; and as this spreads the whole foot becomes involved in canker.

What to do.—In the first place, if the causes which have produced the disease are still in operation, remove these. In any case, when the horse is to be stabled, use dry litter, and see that the stall is kept clear of moist excrement, and that it is well ventilated.

If the disease is secondary, the treatment must of course be directed to removing the affection from which it has sprung.

In its simple stages, it may be easily cured in the following manner:

Clean well with soap suds, and allow to dry. Then, wet a piece of cloth or string of tow with the liniment No. 2, and press it into the cleft of the frog and the corresponding part of the heel. Remove the tow next morning. Continue this treatment, (putting in the saturated tow at evening), for four days; then omit a day: and so on until a cure is effected.

Or, sprinkle a small quantity of bluevitriol in the cleft of the frog, and then fill up the cavities with cotton, which so press in as to keep out all dirt. Repeat until the foot is cured.

When it has arisen from grossness and inflammation, rather than from filth or other local cause, give a dose of Epsom salts, from six to eight ounces, according to degree of inflammation; use less stimulating food, and give him regular, but not too severe exercise every day. The local application must not be of a stimulating character. Put the foot in a bran poultice, and let it remain for some days, till the inflammation is reduced. Be careful, however, not to use the poultice too much, as undue softening is injurious. Then dress the frog with tar ointment, (a mixture of equal parts of tar and grease). If the frog is found not to harden by the application of the tar ointment, moisten it occasionally with a solution of 10 grs. of blue-stone to 1 oz. of water; or, (which is a somewhat more powerful medicine), 5 grs. of chloride of zinc to 1 oz. of water.

When the disease has become chronic, it is hard to effect a cure, and the following course ought to be adopted: Clean away all the ragged portions of horn, so as to reach the sensitive parts. Then smear some tow with this ointment.

No. 5.
1 Drachm ointment of nitrate of mercury,
1 Oz. zinc ointment,
4 Drops creosote.

Mix well; and having smeared the tow with the preparation, as directed, press it into the cleft of the foot and retain it there by a bar shoe, slightly tacked on. Apply this every day, observing its effects. If found not to do well, try a wash made of six grains of sulphate of zinc, dissolved in one ounce of water. As the frog grows, it should be kept supple with tar ointment. The bar shoe should be kept on until the frog is fully developed. Some degree of pressure must be employed by means of tow, and this pressure should be increased as the horn increases in substance. When proud flesh is obstinate it may be burnt away at once by forcing a stick of nitrate of silver (lunar caustic,) into it.

In chronic cases, the horse should have, once a day, in his food, an alterative dose, (a mild improver of health), say a table-spoonful of sulphur and powdered sassafras, of each an equal quantity.

The following mixture is sometimes found valuable when there is a tendency to proud flesh. The ingredients are to be well stirred together and sprinkled into the cleft of the frog, where it must be confined in the same manner as directed for powdered blue vitriol alone:

No. 6.
1 Oz powdered blue vitriol,
1 Oz. copperas,
2 Oz. burnt alum,
1-2 Oz. white vitriol.

IV. Swelled Ankles.

Causes.—This affection invariably arises from a diseased condition of the feet. Its origin may sometimes be traced to diseases of the navicular and lower pastern joints; but it is known to proceed for the most part from hoof rot. It seems occasionally, however, to result from a plethoric condition of the general system, a superabundance of blood, hard work, severe strains, etc., etc.

How to Know It.—Confined almost wholly to the ankle joints, it is not difficult of detection—the only point of importance being to determine whether the swelling is merely spasmodic and temporary, or whether it is the result of a primary disorder which requires attention. It is generally perceptible of a morning, and disappears during the day, because exercise restores healthful action; but when there is really a diseased condition of the bottom of the foot, the fever caused thereby inflames the membrane of the joint, under the skin, while the horse is inactive, and the swelling again takes place. If the ankles present a swollen appearance from morning to morning, attention should be directed to discover the real condition of the foot; and appropriate treatment must be resorted to before the disease takes the chronic and more advanced form of swelled legs, cracked heels, or scratches.

What to do.—If the swelling proceeds from plethora, or too great fulness of the general system, give an occasional dose of Epsom salts, to reduce the tendency to inflammation; and feed upon green and succulent food.

If it proceeds from soreness of the bottom of the foot, apply No. 2 freely every day for four days; then omit for two days, and apply again. If there is any appearance of thrush or cracked heels, treat as directed for the removal of these.

V. Swelled Legs.

Causes.—Swelled legs may be the result either of an undue deposit of serum or watery particles of the blood, or of inflammation of the cellular tissue lying between the skin and bones in those parts of the leg most destitute of muscles.

A poor condition of the blood, or feebleness from great loss of it, may cause the legs to swell, since the fluids conveyed to the extremities by the capillaries accumulate there, because, in the absence of muscular activity, the veins have no power to return them. Diseased kidneys have a tendency to produce this disorder of the legs.

The inflammatory type may result from blows upon the lower leg; from concussion; or, in general, from anything that may arrest the

action of the cellular tissue referred to, causing it to become dry and at length acutely inflamed. It may also arise from the shifting of inflammation from other parts, as from the lungs, kidneys, etc.

Horses of coarse fiber and full habit, accustomed to exercise, if allowed to stand idle several days, will have swelled legs from the accumulation of watery fluid; and, if unattended to, the parts may soon be attacked by inflammation, when the tissues become involved, and the disease assumes its more serious type.

It is occasionally a mere extension of the effects of cracked heels, with its primary cause resting in whatever may have produced the primary disorder.

How to know it.—The leg becomes greatly swollen, and looks as though it was stretched to its utmost tension. Occasionally, the swelling appears almost suddenly, and then as suddenly subsides, in which case the cause may be considered as having but just begun to operate; and if now treated, it is easily managed. Again, it is sometimes sudden in its attack, and violent; the skin is hot, dry, and extremely tender, and the pulse is quick and hard, while a peculiar lameness speedily sets in The swelling may extend to the sheath and along the belly, as far as the muscles of the breast.

In the more advanced stage of the disease small cracks appear in the skin, and from these exudes a watery matter, of whitish-yellow color, similar to that which is seen in cracked heels. In this case it must be taken for granted that no treatment, however skilfull, can speedily remove it; that the improvement must be slow, and consequently much time required.

What to do.—If the disease seems to be merely undue deposit of serum, owing to confinement, nothing more may be necessary than to give the animal a dose or two of niter, daily, to act upon the kidneys; and to exercise him regularly, to induce absorption. In the administering of a diuretic, however, even so simple as niter, care should be taken that it is not left to ignorant and irresponsible grooms, since it may be given in excess, and result in disordering the kidneys, and thus ultimately inducing the very disease which it is intended to remedy.

When there is a tendency to swelled legs which manifests itself in the morning, but disappears during the exercise of the day, an excellent preventive is to stand the horse in cold water to his knees, half an hour, just before night, and then rub dry before stabling; but care must be taken to dry the legs thoroughly, or the plan is plainly objectionable. If it should be found not to yield to this, administer the niter in moderation, as previously directed, and exercise the horse regularly, causing him

to sweat, both of which have a tendency to diminish the accumulated fluid, and to assist the veins and absorbents in their functions.

In case the horse is in a debilitated condition, and the swelling is manifestly owing to the sluggishness of the circulation, he should be well fed, on nutritious diet, and the leg or legs should be firmly, but not tightly, bandaged. Then prepare the following—a tonic and somewhat stimulating medicine:

No. 7.
½ Oz. pulverized assafœtida,
1 Oz. cream of tartar,
2 Oz. powdered gentian,
2 Oz. African ginger,
4 Oz. finely pulverized poplar bark.

Rub these ingredients together in a mortar until thoroughly mixed. Divide this into six doses, and give one, in the food, every night till exhausted. The bandage should be removed from time to time, and the limb subjected to a brisk hand-rubbing, or rubbing with a medium coarse cloth.

If the disease has become chronic, and the animal is much debilitated, the following more stimulating medicine should be used.

No. 8.
1 Oz. powdered golden seal,
1 Oz. gentian,
1 Oz. balmony, (or snakehead),
½ Lb. flax seed.

Mix well; and divide into six doses, of which give one night and morning in the food. Bandage and rub alternately, as previously directed. If the disease does not speedily show signs of yielding to this treatment, apply, every night, omitting the bandage, the following liniment:

No. 9.
2 Oz. essence of cedar,
1 Oz. tincture of capsicum,
1 pint new rum.

When cracking of the skin has taken place, so that matter exudes, and there is much fever, the following course has been found eminently successful, and must be at once adopted: First, take from the neck vein three quarts of blood. Mix finely pulverized sulphur and rosin, in the proportion of two parts of the former to one of the latter; and give daily, for three or four days, six ounces of this mixture. It should be put into meal or bran, and the horse should be allowed no other food until he readily takes this. Meanwhile, apply No. 2 every morning to the parts most evidently affected, until the swelling has entirely subsided.

In these chronic cases, it is best not to feed on very nutritious, or at

least, stimulating food, unless the horse is in low general condition. Ordinarily, pasturing will be best, when the season admits of it. If it does not, he should have light, moist diet; and his stable should be clean, dry, roomy, and so supplied with litter as to induce him to lie down as much as possible.

VI. Surfeit.

Causes.—This disease, sometimes known as prurigo, has for its predisposing cause a thick and impure state of the blood, with deranged condition of the digestive organs. When the animal is in such case, any sudden exposure to chill, especially when he has been heated, will produce surfeit-pimples; and unless the general condition be attended to, a confirmed case of skin disease may be the result.

It generally appears in the Spring, at the time of shedding, when the skin is more exposed than at any other time of year, and the horse is still exposed to sudden spells of cold and wet weather. The skin, thus bare, is easily affected; and if the chill is severe or too frequently repeated, inflammation sets in, and the cuticle or outer skin becomes hard and dry because the pores are so closed as to retain the oily secretions necessary to moisten the surface.

Some poisonous herbs produce this, or a similar, eruption of the skin, and musty hay has been known to have a like effect.

Quick surfeit, or that which arises suddenly, even in animals in good general condition, upon being overheated and suddenly cooled by chill air or an over-draught of water, may disappear upon his being brought to a sweat by exercise; but that which is contracted while the horse is in general ill condition is apt to become confirmed, and, unless timely attention is bestowed, may settle on the lungs and cause serious trouble.

How to know it.—No symptoms precede an attack of surfeit by which its approach may be known. The pimples or lumps, in quick surfeit, suddenly appear, and almost as quickly subside. When a case of confirmed surfeit has set in, the skin is hard, dry, and feverish; and pimples appear, sometimes confined to the neck, but more frequently spread over the sides, back, loins, and quarters. Occasionally, these are attended with great itching, while again they seem to cause no annoyance. When they have remained a few days, they discharge, in small quantities, a thin, whitish, oily matter. Small, scabby excrescences, formed by the discharging sores, cover the parts. These come off, taking the hair with them, and leaving a small scaly spot—sometimes, though rarely, a sore.

Surfeit is sometimes mistaken for button-farcy; but it may be distinguished from this by the shape of the pimples: in surfeit these are

elevated in the center; whereas, in farcy the lumps are rather flat on top and have thick edges, like a button in the skin. Farcy buds generally

A Horse Affected with Surfeit.

appear on the inside of the thighs and fore legs, while surfeit pimples are seldom found in these places.

If not promptly and properly attended to, surfeit is likely to degenerate into mange, which it is sometimes taken to be, even in its early stages; but it may be known from mange by trying the short hairs at the roots of the mane: if it is mange, they will be loose and come out; but if surfeit, they will show their natural condition.

What to do.—If the general condition of the horse is good, and the affection has evidently arisen from sudden exposure or some other imprudence on the part of the person having him in charge, little treatment will be necessary. Prevent costiveness and keep down fever by cooling food, such as bran mashes, roots, and other moist provender. Give arsenical drink once a day, a pint at a time, to act on the skin, until cure is effected, being careful, meanwhile, if the weather is cool, to keep the horse comfortably warm—blanketing him if necessary; and a half hour's walking exercise should be given him daily. The arsenical drink consists of these ingredients in the proportions named:

No. 10.
1 Fluid oz. arsenicalis, or Fowler's solution,
1 ½ Fluid oz. tincture of muriate of iron,
1 Quart water.

If the disease has sprung from a thick and impure state of the blood, disordered digestive organs, and general ill condition, take from the

neck vein from three to five quarts of blood, according to strength, extent of eruption and degree of fever. Keep him from becoming costive by cooling and laxative food, as previously directed; see that he is comfortably stabled, if the weather is at all inclement, and give, on several successive nights, the following alterative:

No. 11. 2 Drachms levigated (finely ground) antimony,
3 Drachms niter,
4 Drachms sulphur.

The food should be good—if possible, green and succulent; and it will be found advantageous to take the chill from water given him, if the weather is at all cold. If the appetite is bad, place gruel in the manger, so that he may use it instead of water till stronger food is relished.

If it is Summer, or Spring is sufficiently advanced to be mild, he may be turned to pasture; but in any event, he should be allowed to rest during treatment.

In the more confirmed cases a speedy cure is not to be expected; but good food, not of a nature to induce costiveness and inflammation, and proper care as to warmth and cleanliness, together with a proper use of No. 11, will bring the patient round in time.

In very obstinate cases, occasionally anoint those parts where the lumps appear with a mixture of sulphur and lard, in equal proportions.

VII. Mange.

Causes.—This is sometimes brought about by the same causes as surfeit; or rather, it is indeed but an advanced or chronic stage of that disease; though in some cases of the same kind, it is of a much more serious character in itself, and highly contagious.

When not a mere secondary stage of neglected surfeit, its immediate cause is a parasite—the acarus—bred in the skin of the animal when subjected to dirt and filth, and debilitated by hard living and ill usage, or by total neglect and lack of food. The acarus produces mange in the horse in the same manner as the human parasite produces itch in man; but it is of a different species, and frequently so large as to be visible to the naked eye.

Neglect, starvation, and accumulated filth having induced a depraved state of the digestive apparatus, with which the skin sympathises, and the insect once having obtained a lodgment, the horse, unless promptly taken in hand, soon becomes a loathsome object, and dies.

The disease once contracted in this way, may be communicated to even sound animals, in good condition: in fact, the great majority of cases are thus contracted, as comparatively few animals are so utterly neglected

or exposed to filthy influences as to become in themselves the generators of these mange-breeding insects. It is regarded as one of the most contagious diseases to which the horse is subject, and may be imparted not only to other horses, but to cattle, hogs, and dogs, though it is asserted by good authority that none of these can in turn communicate it to the horse.

The curry-comb, brush, collar, or blanket which has been used on a mangy horse will produce the infection in another; and to lie in the same stall or to rub where a mangy horse has rubbed himself is almost certain to communicate it unless the animal so exposed is exceedingly healthful and in active condition of body.

How to Know It.—The skin is at first scabby, the hair comes off, and the outer skin becomes broken into little scale-like pieces. These fall off, or are rubbed off, and leave the parts raw and sore. The general appearance of the skin where the raw spots are not too numerous is a dirty brown, and it is loose, flabby and puckered. The horse is impelled by itching to rub himself frequently and violently, and he thus leaves his scurf, dandruff, and in the more advanced stage, his parasites, at every place.

Usually, where the disease is engendered in the animal itself, it appears first on the side of the neck, just at the edges of the mane, and on the inside of the quarters near the root of the tail. From these parts the eruption extends along the back and down the sides, seldom involving the extremities, except in the very worst cases. Sometimes, though rarely, the ears and eye-brows are attacked and left bare.

When it is the result of contagion, the horse may at first be in health; but the constant irritation makes him feverish, the hair falls off as in the first case described, leaving the skin in those places almost bare; and little red pimples appear here and there. Each of these contains a parasite, and the pimples are connected by furrows along which the parasites have worked their way. In time they increase in number and size, and from them exudes a matter which hardens into a scab. Under these scabs the parasites may be found, upon removing them and carefully examining in the sunlight.

In the early stage of the disease, where it may be suspected, but is not yet fully manifest, it may be detected by placing the fingers among the roots of the mane and tickling the skin with the nails. The horse is so sensitive to titillation when in this condition that he will thereupon stretch out his neck and evince the most unmistakable pleasure as long as the tickling continues.

What to do.—The most effectual preventive, it will be readily inferred

from the preceding statement of causes, is cleanliness. In no case should a healthy animal be allowed to occupy a stable where a mangy one has been kept until it shall have previously been washed with water strongly impregnated with sulphur and chloride of lime—say half a pound of powdered sulphur and one pint of chloride of lime to each gallon of water. If the stable is thoroughly cleansed of loose litter and dirt, and all parts that may have been rubbed against by a mangy horse perfectly saturated with this solution two or three times, on as many consecutive days, there can be no danger in using it. Clothing, curry-comb, brush, etc., that may have come in contact with such animal, should be burned up.

If starvation, weakness, and general ill condition have caused the mange, a patent means for its removal will be found in giving him clean quarters and good nourishing food; which, however, should not be at first of a heating nature. Generous pasturage, unless the weather is damp, will be sufficient; otherwise, a full supply of oats and chop food should be given. It cannot be too much insisted upon that especially while treating a horse for disease his stable should be dry, well ventilated and properly supplied with litter.

In cases of full habit of body, where the disease is the result of contact, and the presence of high fever is noted, bleed once, taking from the neck vein from three to five quarts, according to the condition of the animal and the degree of fever; but if it is the result of poverty and debility, do not bleed at all.

Next, have him as thoroughly cleansed of scab and dirt as possible, with a wisp of hay, and by softly and lightly using a curry-comb. Then prepare a liniment of the following ingredients and in the proportions here given for greater or less quantities:

No. 12.
1 Quart animal glycerine,
1 Gill creosote.
½ Pint turpentine,
1 Gill oil of juniper.

Mix all together and shake well; and with this saturate the whole skin, as nearly as possible, rubbing in well with a soft cloth. Care must be taken to rub it in thoroughly. A little well rubbed in is better than much merely smeared on.

Leave him in this condition two days; then wash him well with warm water and soft soap; stand him in the sunshine if the weather admits, and rub with a wisp of hay or with suitable cloths until he is dry; after which, anoint him pretty well all over with the mixture described, No. 12, and *rub it in*. This course should be pursued until a cure is effected.

Two to four applications will generally be found sufficient, even in obstinate cases, if care is taken as to food and drink. The following alterative will be found beneficial:

No. 13.
1 Oz. tartarized antimony,
2 Drs. muriate of quicksilver,
3 Oz. powdered ginger.
3 Oz. powdered anise seeds.

Mix with mucilage so as to form a consistent mass; divide into six balls, and give one every morning till the eruption disappears.

Care must be taken that the patient is not exposed to rain or heavy dews while under this course of treatment.

VIII Ringworm.

Causes.—There are two kinds of ringworm; one simple, of spontaneous origin, and non-contagious. The other contagious. The first is usually the result of indigestion or confinement in close and foul apartments, as in filthy and ill-aired stables, railroad cars or ship holds. The latter, or contagous kind, is found on horses of good condition, as well as on diseased and neglected ones, and is produced by vegetable parasites in the hairs and hair-glands.

How to know it.—It is especially common in Winter and Spring, and appears on the face, neck, shoulders, sides, and sometimes elsewhere.

When non-contagious, it may usually be known by its appearing as an eruption of small blisters, about the size of a wheat grain, on inflamed patches of skin. These assume a circular form; and if not seasonably attended to, the circle enlarges and covers fresh portions of skin.

The contagious type appears in round, bald spots, covered with white scales, and surrounded by a ring of bristly, broken, or split hairs, with scabs around the roots, and some eruption on the skin. These broken hairs soon drop out, and a wider ring is formed. The most marked characteristic of the contagious or parasitical ringworm is the splitting of the hairs in the ring, and the perfect baldness of the central part.

Occasionally the patches, in either form of the disease, assume an irregular rather than a really circular form.

Any attack of this sort is usually marked also by the horse's rubbing and scratching himself against the sides of his stable, or convenient objects outside; but this is not to be depended upon as a marked symptom, since it likewise indicates surfeit and mange.

What to do.—If a simple, non-contagious case, shave the hairs as closely as possible from the affected part, and paint with tincture of iodine; or, if scratches or little ulcers have appeared on the patch, rub it with the following stimulating and healing ointment:

No. 14. 10 Grains nitrate of silver,
1 Oz. lard.

If it is a case of the contagious or scaly variety, wash the patches thoroughly with soft water and soft soap, and then rub every day with the following ointment:

No. 15. ½ Drachm iodine,
1 Drachm iodide of potash,
1 Oz. cosmoline.

If through neglect and long standing it has ulcerated, use this ointment twice daily:

No. 16. 6 Oz. pyroligneous acid,
5 Oz. linseed oil,
2 Oz. spirits of camphor.

If it has become obstinate—not yielding to the foregoing treatment—apply a blister directly over the patch, and then treat as for a common sore, using some simple ointment.

If there are signs of constipation and fever, care must be taken to keep the bowels open and regular, and to avoid stimulating grain food. A seasonable supply of cut grass and sliced potatoes, or of carrots, if they can be obtained, should be allowed. If in Spring and Summer, and the horse is not in active use, put him to pasture for a few days.

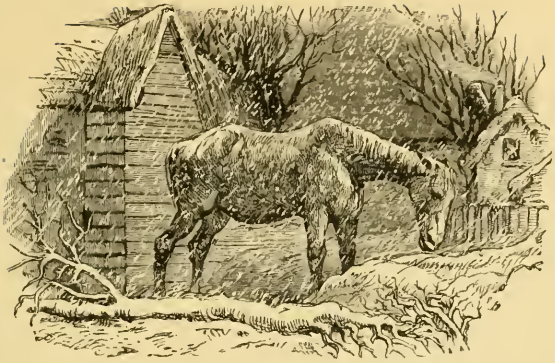
When the horse shows a tendency to weakness, as is sometimes the case with young animals, and with those suffering from neglect, give good nutritious food, and tonic medicine in moderation.

To prevent spreading the contagious form, clean the stable where a horse so afflicted has stood, and white-wash its interior thoroughly. Wash the harness, collars, and whatever else may have covered the ringworm, with strong soap and water, and rub them over with a solution of corrosive sublimate, (one drachm to a pint of water.) If the horse has been blanketed while suffering with the disease, the blanket should be well boiled.

IX. Hide-bound.

Causes.—Strictly speaking, this is not of itself a disease, though the skin is in a peculiarly abnormal condition, but the result of a diseased condition of the general system or of derangement of some specific vital function. With respect to the causes from which it arises, it is somewhat similar to mange; but, unlike mange, it is neither eruptive nor contagious.

Poverty and cruel usage—the food being deficient in quantity or



One of the Causes of Hide-bound in Horses.

quality, and the labor onerous—bring on impaired digestion; the blood becomes thick, dark, and feverish, because the secretive processes are sluggishly performed; the skin sympathizes with these internal disorders, and the lubricating fluid through the pores is suspended; and then, instead of remaining soft and pliant, it becomes dry and adheres to the body. A disordered state of the stomach, bowels, and urinary and respiratory organs may be considered as having produced it when no specific form of disease can be discovered as existing; but it is an almost invariable accompaniment, in a greater or less degree of intensity, of big head, glanders, grease, farcy, founder, distemper, bad cases of swinney, big shoulder, lock-jaw, consumption, and chronic dysentery. The fever in these dries up the watery secretions and shrinks the hide.

Formerly it was supposed to be caused by worms in the stomach and alimentary canal; but this is erroneous. Worms may of course exist while the horse is in this state, but they are rather a consequence than a cause—the result of imperfect digestion and excretion. The skin, as has been elsewhere stated, sympathizes readily with the vital internal organs, and in all obscure cases hide-bound should be considered a symptom of disorder in these, and treated accordingly.

How to know it.—The skin is dry and hard, and the hair is rough and rusty. Both are evidently destitute of that oil by which in health they are kept in soft, pliant, and glossy condition. Adhering almost immovably to the ribs, legs, neck—almost every part of the body—the skin cannot be caught up in folds with the hand. At times it appears scurfy, and the exhalants, (having the quality of giving out or evaporating), pour

forth unusual quantities of matter, the more solid portions of which form scales and give the horse a filthy appearance.

The excrement or dung is dry, hard, and black.

What to do.—Especial pains must be taken to discover, if possible, what specific disease has given rise to this state of the skin. If the cause is obscure, direct the treatment to restoring a healthy condition of the digestive organs. Begin by bettering his treatment in every way. Instead of hard labor, he should have only gentle exercise, and instead of being left exposed to the rain, snow, and merciless winds, in barren pasture land or filthy barnyard, he should be well sheltered, and, in Winter, blanketed—using for this purpose two blankets joined along his back by tapes so that a space of an inch or two may be left for the escape of insensible perspiration. Instead of allowing the skin to grow clogged, torpid, and dead for want of cleanliness and friction, he should have regular daily currying and brisk rubbing with good brush or coarse cloth, which will materially aid in restoring healthy action of the skin.

If it is pasture season, give him a run at good grass during the day; but stable at night in a clean stable, furnished with dry litter, and give him a generous feed of bran and oats, or moistened bran and chopped hay. Mix with the food night and morning, the following alterative:

No. 17

3 Oz. powdered sasafras bark,
3 Oz. sulphur,
3 Oz. salt,
2 Oz. bloodroot,
2 Oz. balmony,
1 Lb. oatmeal.

Mix, and divide into twelve doses.

If he appears in the beginning of the treatment to be filthy, feverish, and stiff, bleed him—taking from the neck vein three quarts. If the stiffness continues, bleed again after seven days, taking a like quantity.

If the appetite is bad, mix with No. 17, (the alterative above described), a spoonful of ground ginger; but in general you should avoid cordials, tonics, and aromatics, (that is, warm and pungent medicines). They may arouse fever that would otherwise fail to develop itself, and thus defeat the object for which the mild laxatives and temperate alteratives prescribed have been given. Cordials may indeed arouse the vital functions to sudden action; but even if no lasting fever is created, the action soon subsides, rendering it necessary to continue the cordial or forego whatever seeming advantage may have been derived from it. If excitment is continued by this means, the powers of nature are impaired and lasting injury done.

A good and sufficient tonic may be furnished, of which the horse will

partake as much as the system requires, by placing a poplar pole in the stable, upon which he can conveniently gnaw.

If the time is Winter, it will generally be found necessary to begin the course of treatment by giving a purgative, say two ounces of Epsom salts, which may be repeated within seven hours if it fails to produce the desired action; and to feed him on laxative food until constipation is overcome and a healthful action of the bowels restored.

Remember that one of the very first objects is to establish regular action of the bowels; and then generous diet, (let it be green and succulent if possible, but at any rate nutritious without being inflammatory), with cleanliness and regular friction of the hide, will do more than medicine. Do not expect to effect a speedy cure; in any event, the very existence of hide-bound indicates chronic disorder, and all chronic diseases require time.

If it is known to be the result of a well-defined disease, as big-head, farcy, etc., the treatment must of course be directed to the removal of that, according to directions elsewhere given in this work; and the hide-bound will disappear as its immediate cause is removed.

X. Saddle Galls, or Sit-fasts.

Causes.—These are swellings, sores, and tumors, caused by ill-fitting saddle or harness. Different names are applied to them according to their appearance and character. When a mere heated swelling on the horse's back or shoulders is unattended to, while he is kept in constant use, it sometimes assumes the appearance of a dead patch of skin, and is then called a *warble;* when these ulcerate and discharge pus, and a leather-like piece of skin is firmly fixed upon the top of it, the name *sit-fast* is applied; and when, by the use of saddle or harness before a warble or sitfast is thoroughly healed, a hard, callous lump is formed, it is called a *navel gall*—said to be so called because it is generally on that part of the back opposite the navel.

How to know it.—These swellings, sores, and tumors require no further description than has already been given.

What to do.—The first and most essential thing is, that the animal shall be allowed to rest; or at any rate be subjected to such labor only as will not require the same chafing, abrading saddle or harness which has produced the trouble.

Then, if it is merely a gall or scald—a heated, tender swelling, without either suppuration or hardness—bathe with cold salt and water two or three times daily. When the heat and tenderness are sensibly reduced, anoint occasionally, until the lump has entirely disappeared, with a mixture of tar and olive oil, equal parts.

If it has assumed the character of a sitfast, do not use the knife, nor try to tear the dry skin away, but bathe with warm soft water, and then apply a poultice. This must be repeated, if necessary, until the callous skin is easily removed, and then anoint frequently, until the sore is healed, with the following:

No. 18. 1 Dr. iodide of potash,
6 Drs. simple ointment,
2 Drs. glycerine.

When it has reached the stage of navel gall—hard, grisly, almost horny—apply daily the camphorated, corrosive sublimate, No. 2. Shake the bottle well before pouring it out; use a mop with which to put it on; then, when it is thoroughly saturated with this liniment, use a hot iron with which to dry it in.

When one finds his horse suffering in this way under saddle or harness, his own interests, as well as the promptings of humanity, demand that he shall at once remove the cause, if possible; but it is sometimes the case that this cannot be done—absence on a journey, military necessity, press of farm or road work, requiring regular service. Under these circumstances the saddle or harness should receive immediate attention and subsequent watchfulness on the part of the rider or driver. The padding must be taken out of the saddle or collar so as to obviate pressure on the part affected; or, as for the saddle, the blanket may be so arranged as to lift it from the spot. The sore place must be bathed well with salt and water as soon as possible after it is discovered; and then covered with a piece of adhesive plaster, heated, of course, until it sticks readily. If matter has formed, a hole should be cut in the middle of the plaster to allow it to escape.

Treated in this way, the horse may be ridden from day to day, and recover while in use.

Greasing collars and other parts of harness will frequently prevent that chafing which results in sores and callous tumors.

If the horse, through constitutional tenderness, is subject to these swellings and sores, it is well to put the saddle on half an hour before using him; and leave it on, having slightly loosened the girths, for a half hour or an hour afterward, thus preventing sudden change in the temperature of the skin.

XI. Fungous Collar Tumor.

Causes.—This in its nature is essentially the same as that described in the preceding section as saddle gall, or sitfast—differing, however, in location and specific cause. It is an inflammation and swelling beneath

the large flat muscle that covers the front of the shoulder, and is caused by the chafing of the collar.

How to know it.—It is scarcely necessary to undertake farther description of a well-known, visible affection. It is usually found near the point of the shoulder; and the character of the tumor as to simplicity or severity can be readily determined by examination. If of considerable standing, it will be found so hard as to render it almost impossible to detect any fluctuation that would indicate the presence of matter. Where there is much swelling, however, there is almost invariably matter, and no cure can be effected until this is removed. In cases less marked there will be a small, hard or indurated lump without matter.

Under similar conditions as those mentioned in the preceding section, it may form a leathery patch in the center and become a real sitfast.

What to do.—The tumor must, if possible, be so treated as to leave no scar or lump, as this would be easily irritated by the collar upon subsequent use, and prove a source of constant trouble. The first thing in order will be to take the horse from work, if at all practicable. If not, use a breast-strap, so as to prevent all further chafing. If the swelling is recent, apply cold water often, or cover the part with a wet rag hung over the shoulders in such a way as to remain in contact with the swelling. This must be kept constantly wet.

But if the tumor is large, and of long standing—already hardened and containing matter deeply hidden, open with a knife—making a smooth, vertical cut, and of sufficient depth to thoroughly evacuate the pus. Syringe the opening well every day with the following solution:

No. 19. 30 Grains chloride of zinc,
1 Quart water.

If the wound seems inclined to heal and leave a hard lump in doing so, discontinue the injection, and rub frequently with the following liniment to promote the absorption of the callous or gristly formation:

No. 20. 1 Oz. iodine,
12 Oz. soap liniment.

XII. Warts.

Causes.—It is difficult to point out anything that may be implicitly received as the cause of these excrescences. Generally accompanying a plethoric condition, they may be considered as owing their origin primarily to high feeding and insufficient exercise. This, however, must not be taken as conclusive, since they not unfrequently appear upon active animals, of meagre habit.

The manner of their formation seems to be this: Knots in the true skin are gradually developed, being surrounded with a covering of the scarf-skin, something thickened and matted together; and this outer covering generally dries and splits into fibers towards the top, while blood, in greater quantities than usual, is sent to the inner or vascular parts; and more nutriment is thus diverted to it than to the surrounding flesh, so that an upward or outward growth is promoted.

Seed warts usually make their appearance on the eyelids, the nose, the sheath and adjoining parts of the belly; the encysted or sac warts, on the pasterns, hock-joints, and knee-joints, and sometimes upon the sheath and neighboring parts.

Unless warts appear upon the penis they are not injurious to health, and at first occasion little inconvenience unless upon the shoulder or some part where harness or saddle touches constantly; but they should be removed, nevertheless—particularly the sac wart and those seed warts which manifest a tendency to enlargement. If the encysted or blood wart is allowed to remain it will almost invariably enlarge and spread.

How to know it.—There are two kinds of these formations, one of which is fibrous, white, and gristly or cartilaginous, but somewhat spongy lump, contained in a sac or cell which has taken its rise from the outer or scarf-skin; and the other is a somewhat cartilaginous substance, not inclosed, but adhering firmly to the skin—a hard excrescence,—the "seed wart,"—which is too well known to require particular description. It is sometimes difficult to distinguish the blood wart, as the former is sometimes called, from the seed wart; but it generally presents a more rounded, smooth appearance, and sometimes hangs as by a little stem, in which last case it is readily known.

What to do.—If there is doubt as to the character of the wart, the matter may be speedily determined by running a sharp-knife through it; when, if a blood or sac wart, the contents will come out, accompanied by more or less copious bleeding; whereas, the seed wart will in this case be merely divided by the incision, each part retaining its firmness or consistency.

When the blood wart is thus opened, nothing more will be necessary than to touch the part with a solution of chloride of zinc, one grain to the ounce of water, or lunar caustic. When these warts are attached to the skin by narrow bases, or small stems, they may be clipped off with knife or scissors, and the part slightly burned over with caustic as previously directed.

If the growth is of the fixed kind, or seed wart, remove by means of scissors or knife when standing singly; but if the stem or base is large,

or if the warts grow in bunches, too numerous and too close together to be cut away, pick off or otherwise chafe the rough outer surface so as to make it bleed; then with a stiff brush rub in yellow orpiment wetted with a little water, and in a few days they will come away, or may be rubbed off, and leave a healthy sore, which soon heals. If the entire wart does not come off by reason of one application, repeat.

When the penis is wholly covered with warts, the best plan is to have it amputated, as the warts cannot easily be removed without destroying as much of it as it would be necessary to remove entirely in order to be rid of them.

XIII. Vermin.

Causes.—Vermin are both a cause and a consequent of skin disease; and being also bred in the hairy covering, perhaps in the very skin itself, they are properly treated in this connection.

Every species of animal is more or less troubled with his own peculiar insect tormentor; and while no well-defined cause can be assigned as to their origin, they are almost always found associated with filth and squalor.

They sometimes, however, trouble animals of fair condition, and accustomed to reasonable care; but in this case they are caught by contact.

Poor, ill-cared-for, mangy horses, colts in the Spring of the year, with long, uncurried coats, and old and feeble horses with like rough and shaggy covering, most probably breed them; and on these they are most frequently and plentifully found.

The itching torment to which they subject diseased animals doubtless intensifies whatever disorder may exist; and the very earliest opportunity should be taken to eradicate them from the sufferer.

When horses stand in proximity to a hen-house, they are often seriously annoyed with hen-lice, which are even more tormenting than those peculiar to the horse himself.

How to know it.—The horse infested with vermin will usually manifest his uneasiness by biting and rubbing himself; but their presence may be unmistakably detected by a more or less careful examination of his coat.

What to do.—If the horse is suffering from some skin disease requiring treatment, the means adopted for this will almost invariably suffice of themselves to remove the vermin; but where no such disease exists, and it is a simple case of lousiness, anoint him with the following salve:

No. 21. 1 Dr. carbolic acid crystals,
1 Quart fresh lard.

Rub it upon every part of the body thoroughly; wash with warm soap suds next day; repeat if necessary—at last washing and drying.

Attention to his general health will also be demanded; and to this end he should be upon good pasture, or a liberal supply of nourishing but not heating food should be given.

If it is a case of hen-lice, the first thing to be done is to remove the horse from the place infested with these, and then to anoint and wash as before directed.

XIV. Larva in the Skin.

Causes.—The larva, which infests chiefly the back—that part of the horse upon which saddle or harness must press—is not only a source of trouble to the animal, but of great inconvenience to the master, as the acute painfulness of a tumor raised by one of these grubs often prevents use.

The larva is the offspring of a fly which deposits its eggs upon the back and sides of the horse while he is out at pasture or roaming at large upon the common. This fly does not frequent the barn-yard and stable, so that horses which are confined to these when not in use are never annoyed with the larva.

The eggs are hatched by the warmth of the animal; and the creature burrows into the skin, where it remains and grows till Spring, raising meanwhile, by its irritating presence, a small lump, which is eventually developed into a painful tumor, upon the pus of which the insect prolongs a life that it began upon the natural juices of the skin and cellular tissue.

How to know it.—The most unmistakable sign of the trouble, when it is not plainly discernible with the eye, is the restlessness manifested by the horse when subjected to the saddle. When he does this, and no well-defined occasion for his displeasure and his pranks is readily perceptible, examination will reveal a tumor or abscess if the larva is present; for the horse will hardly grow restive at first, when there is a mere lump in the skin. Upon the top of this abscess a black spot will be found, which is the point of entrance, and the opening through which the insect obtains the little air that it needs.

What to do.—The best thing to do, because both quickest and safest, is to open the top of the tumor slightly with a lancet, and then to squeeze out the larva. The wound should then be dressed a time or two

with a solution of one grain of chloride of zinc to one gill of water; and the trouble will soon be over.

XV. Tetter.

Causes.—This seems to arise from some constitutional cause, which it is difficult to point out. It appears on horses of different conditions or habit of body. On some it breaks out periodically, Summer after Summer.

It is not contagious, unless neglected until it assumes the epizootic form, which it sometimes does, after which it is communicable to both man and horse.

There are said by some to be two or three forms of tetter, but in reality whatever different forms it may assume, when not complicated with other affections, they are indications of different degrees of severity.

How to know it.—The attack is usually sudden, and the animal is observed to rub himself severely, as suffering from intense itchiness. The neck, shoulders, back, and thighs are the points ordinarily affected. Upon examination, the skin will be found red with inflammation, sometimes torn or scratched by rubbing; and the blisters or pimples will be seen on those parts of the inflamed spot not so torn or scratched. These blisters break, and a watery fluid is discharged, which keeps the surface moist.

In its more advanced stage it may be taken for mange; but it may be distinguished from mange by its manifesting less tendency to spread and invade all parts of the skin; and by the absence of parasites under the scabby portions.

What to do.—First, see that the horse's bowels are put in good condition. If there is any tendency to plethora, (too great fulness), to constipation, or general feverishness, give him a purgative dose; and in any event let his food be of such character as to prevent costiveness.

Give, once a day, an ounce of Fowler's solution of arsenic. Rub the affected parts well with sweet oil, and let it remain thereon for a few hours; then wash with warm soapsuds so as to remove the scabs or scales. Then cover the diseased surface and some portion of the healthy skin all round with the following ointment:

No. 22.

½ Lb. flour of sulphur,
¾ Lb. carbonate of potash,
1 Oz. carbolic acid,
2 Lbs. lard,
2 Lbs. olive oil.

Mix well with a gentle heat. Allow it to remain on the skin for two or three days, and then wash off with strong soap and water.

Tar ointment, (equal quantities of tar and lard well mixed with gentle heat), is an excellent external application, and may be used when No. 22 is difficult to procure.

XVI. Rat Tails.

Causes.—Simple tetter, as also mallenders and sallenders, is sometimes allowed through neglect to become obstinate; the skin thickens; ugly cracks are formed, from which flows in abundance a sort of purulent half-watery fluid; upon the thickened portion of the skin the scabs increase, growing up into somewhat perpendicular layers, and the hairs growing from these are glued together by the exuding matter. Such bunches of matted hair are called, by reason of their appearance, "rat tails."

The disease seems occasionally to be produced outright, without the supervention of any other known disorder, by much exposure to wet ground of a chalky or loamy nature, or to sticky mud.

How to know it.—It appears chiefly upon the legs, one or all of which may be affected at the same time; but the hairs of the tail, especially near the root of the tail, are often found in the condition described, and for a like reason. Tetter, ringworm, or some other disorder produces itching; the horse rubs the part till it becomes raw; matter exudes at length, and the hair is matted in bunches along the upper portion of the tail bone, as shown in the figure exhibiting external manifestations of disease.

If resulting from either neglected tetter, no matter what its position, or from mallenders and sallenders, it is accompanied by itchiness; but this is generally less severe than is the case with these disorders in their simple form. When the disease is fully developed, the appearance of the bunches of hair upon the parts is a sufficient indication.

What to do.—As in simple tetter, attention must be directed to establishing a good condition of the bowels; and to this end a purgative may be given—especially if there is any indication of constipation and general feverishness. The food must be regulated by the necessity of keeping down all inflammatory symptoms. Make a tonic powder as follows:

No. 23.
12 Oz. sulphur,
1 Dr. arsenic,
1 Oz. bruised coriander seed.

Divide into twelve parts and give one in the food night and morning.

Dress the sores three times a day with the following lotion, applying with a soft rag:

No. 24.
1 Fluid oz. laudanum,
1 Fluid oz. glycerine,
½ Oz. carbonate of soda,
1 Quart water.

XVII. Mallenders and Sallenders.

Causes.—By these terms are denoted oozy, scurfy patches upon the knee and hock—those which appear back of the knee being called (for what reason nobody seems to know) mallenders; and those which appear in front of the hock, sallenders. They spring from idleness and neglect—an impure state of the blood having been brought on by heating and unsuitable diet, and disorders of the bowels, liver, or kidneys.

Though of no serious importance as diseases, they are unsightly, and, if neglected, they result in troublesome sores.

How to know it.—They first begin as a moist tetter, apt to escape observation until they appear in a roughened state of hair about the parts mentioned, under which the skin is scurfy, feverish and somewhat tender. Itching of such severity sometimes attends them as to render the horse restive and hard to keep under restraint.

What to do.—In the first place attend to the cleanliness of the horse and put him upon a regular course of moderate exercise. Give him twice daily, night and morning, a pint of the excellent alterative and tonic drink:

No. 25.
1 Fluid oz. liquor arsenicalis,
1½ Oz. tincture muriate of iron,
1 Qt. water.

Rub the parts affected two or three times a day with an ointment made as follows:

No. 26.
1 Oz. animal glycerine,
2 Drs. mercurial ointment,
2 Drs. powdered ointment,
1 Oz. spermaceti.

If the scurfy places have developed into suppurating sores, use, instead of the ointment, the following lotion, saturating them well twice a day:

No. 27.
½ Pint animal glycerine,
½ Oz. chloride of zinc,
6 Quarts water.

Be careful that his food is such as to keep him from constipation and fever.

XVIII. Poll-evil.

Causes.— Poll-evil is the name given to a deep abscess having its seat of primary inflammation between the ligament of the neck and the first bone which lies beneath without being attached to it; and it is serious in its nature by reason of this depth and of the difficulty with which the matter formed finds its way to the surface through the strong fibrous membrane that envelopes it. If not attended to in its early stages, the surface of the first bone from the head, or that of the joint between the first two bones, becomes inflamed, and the joint or joints involved.

The disease may be said to owe its origin almost wholly to violence of some kind. A blow upon the poll by a brutal driver may very readily produce it; and much slighter causes, often repeated, result in this affection; as, the forcing on of a tight collar day after day; hanging back and so bruising the poll with bridle or halter; and excessive rubbing of that part because of itch produced by dirt accumulated about the ears and upper point of the neck and not carried away by brush or currycomb. Striking the head against low ceilings and the beams of low doorways is doubtless responsible for very many cases of this dangerous and disagreeable disorder.

How to know it.—A certain restlessness, a throwing back of the head and then returning; again, a drooping tendency, turning the head from one side to the other; a dull appearance about the eyes; a sluggishness of movement—all these are sometimes observed before any symptoms of the disease may be discovered about the head.

Sometimes no notice is taken of its existence until considerable swelling and even an unwholesome discharge have set in; but more frequently an oval tumor is discovered,—hot, tender, situated directly in the region of the nape of the neck, but generally inclining to one side. In the milder form this tumor is evidently superficial; and the horse moves his head with comparative ease and freedom; whereas, in the more advanced stage he carries it stiffly, and every movement of it or the neck causes great pain.

Poll-evil during the First Stage.

Sometimes the disorder is so deeply-seated that the tumor is not developed sufficiently to make much outward show. It is much likelier to discover itself plainly as a well-developed swelling when the hurt is superficial. In any case, it must be examined with the fingers to determine this point. Place the fingers gently upon it, and give the animal time to recover from the little scare into which this touching of a sore at first gives him;

then gradually press upon the part. If the hurt is near the surface, he will flinch quickly; if deeply seated, he will be correspondingly slow in showing evidences of pain. If suppuration has already set in, it can readily be known when near the surface by a sort of fluctuating feeling; but this fluctuation can scarcely be felt at all if the matter is deep seated.

Poll-evil in its Second Stage.

What to do.—If discovered when there is nothing more than a swelling, no matter having yet been found, remove all tendency to general feverishness by giving purgative medicine according to evident fullness of condition; allow the horse to rest; and put him on moderately light diet. Then make the following cooling lotion, and keep the swelling constantly moistened with it by having a small rag pad laid over it and saturated with the mixture from time to time:

No. 28.
2 Oz. tincture of arnica,
1 Dr. iodide of potassium,
1 Qt. vinegar,
1 Qt. camomile infusion.

If this does not reduce the inflammation and remove the swelling within a few days, it may be inferred that matter is already forming, though it may have been impossible at first to detect it; and you must bring it to a head as soon as practicable by poulticing. Use for this purpose a mixture of ground flax seed, corn meal, oil of turpentine, and hog's lard. As soon as matter can be felt, have ready a large and very sharp knife; cast the animal, and have some one to sit upon his neck to prevent struggling; then open with a quick, steady, and strong sweep of the blade through the tumor—being careful to have the wound open at the lower point of the tumor, so as to provide for more easily draining it of matter that may hereafter form. Be careful, too, not to cut the tendinous ligament that runs along the neck under the mane. If the matter appears to be on both sides, open the places separately, so as to leave this ligament undivided. It may, if absolutely necessary, be severed between the second bone and the head, and the support of the head be not materially weakened, since the main stress is on the second bone, and the divided ligament, if healthy, will soon heal again; but it is best to avoid all risks; and if at all convenient, the aid of an experienced veterinary surgeon should be had when it becomes necessary to use the knife.

The wound must now be cleansed by being syringed daily with a stimulating wash, (1-2 dr. chloride of zinc in 1 quart of water), until a healthy discharge sets in, and evidences of healing begin to manifest themselves. Nothing further will then be necessary than to keep the parts clean by daily sponging with warm soapsuds.

It sometimes occurs that before remedial measures are resorted to, not alone the fleshy, but the tendinous, ligamentary, and bony structures have become involved, and the disease has assumed a desperate character. If further neglected, the spinal cord is likely to become diseased, and the case hopeless. If, upon opening a tumor, the matter is found to flow in great quantities, resembling melted glue, with something of an oily consistence, it may be known that the disease is deep-seated and dangerous; and the probe should be employed to find whatever cavities may exist. If any are found, the knife should again be employed, and another cut made, smooth down, and in the same direction as the first, to prevent all rough and hacked walls, till the lowest depths are reached. Then cleanse the wounds with warm soapsuds, using a good gum compress syringe; and dress with a mixture of spirits of turpentine, honey, and tincture of myrrh. When a thick, light-colored matter begins to appear, the dressing must be discontinued, and the parts must be kept clean, as previously directed, by sponging with warm soapsuds.

It is sometimes necessary to cut away loose pieces of ligament till a healthy aspect is presented on the walls and in the depths of the incision.

In the more desperate cases, numerous openings are formed, and these discharge a matter resembling the white of an egg, which adheres to the surrounding parts, and gives to the animal a most repulsive appearance. In this case the knife should be used so as to take in at one sweep the greatest number of openings, and then the other openings should be connected by cuts with this main channel; after which the wound should be cleansed as previously directed, and dressed with the mixture prescribed —spirits of turpentine, honey, and tincture of myrrh.

After matter has formed, the knife is the only sure means of saving the horse; and, in the hands of the skillful man, it is a merciful means. The operation is brief; and the relief is more speedy than can otherwise be obtained. Let no one attempt it, however, who cannot operate as though for the moment divested of feeling, as there must be no hesitation, no awkwardness as to direction, no notching and hacking.

A horse that has once had the poll-evil should never afterward have a collar thrust over his head, or be hauled around with a halter or any other head-gear pressing upon the part. The poll will long remain tender, and a return of the disorder is likely.

If it is necessary to treat during Summer, when the horse is apt to be

annoyed with flies, keep the wound covered with a rag moistened in a solution of tar.

XIX. Fistula.

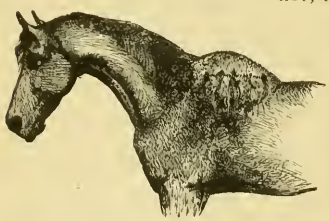
Causes.—This is sometimes known as *fistulous withers*, to distinguish it from fistula of the parotid duct. It is similar to poll-evil and is generally caused in like manner, by bruises. In the case of fistula, these bruises may be caused by an ill-fitting collar; by a lady's saddle, particularly if awkwardly ridden; by the pressing forward of a man's saddle, especially in case of high withers; by striking the withers against the top of a low door-way; by rolling and striking the withers against some hard substance; by the biting of other horses; and by a blow of the blacksmith's hammer. The points of the spinal processes, (little projections of the spine or back bone,) are hurt, inflammation sets in, and the fistulous tumor is produced. Its site is the spine above the shoulders; and it is more troublesome than poll-evil, because it is more exposed to repeated injuries.

How to know it.—The first indication will be a swelling on one or both sides of the withers, generally rather broad and flat. Upon examination with the fingers this will be found hot, tender, and apparently deep seated. If observed when first formed, it will be of uniform hardness throughout. If unattended to while in this state, the tumor soon becomes an abscess; and owing to the difficulty in the way of the matter's escaping, (its natural outlet being at the top of the shoulders), the pus sinks downward; and the abscess sometimes becomes enormous before there is any well defined head, and before there is any opening. When it breaks, or is opened, a large quantity of extremely offensive matter flows out. Ordinarily, the tumor will come to a head in from one to two weeks. When the discharge has begun, the tumor does not begin to grow healthy and heal, but the walls of the opening thicken, and continue to discharge matter which becomes more and more offensive. The matter burrows between the shoulder blade and spinal points, and everything around seems to be rotting away; and it is both difficult and dangerous to trace the opening. In process of time several holes will appear along the course of the muscles in contact with the original abscess, and from each issues a foul discharge, till the ulcerating process seems to extend itself to nearly all the muscles of the shoulder.

The health of the animal may at first be excellent, and there may be no lameness; but as the inflammation extends, there is lameness of the shoulder, and he suffers generally—often greatly. He is averse to motion, and will suffer for food and drink rather than undergo the pain

of trying to reach and partake of it. In its worst stages the bones extending into the sinues decay.

SLIGHT ENLARGEMENT WHICH MAY END IN FISTULOUS WITHERS.



FISTULOUS WITHERS—WORST STAGE.

What to do.—Be careful to ascertain, in the first place, whether the tumor has newly risen. The matter may form in one, even while it is quite small; and it is important to know when the knife may be used to advantage.

If matter has already formed, it can be detected by the somewhat soft and fluctuating feeling of the abscess.

If discovered while still a new formation, take the horse from work, if possible; if not, take especial pains to protect the injured point or points from pressure. A bruise at that point of the withers where the collar rests will not unfit a horse for the saddle, unless considerable inflammation and extending soreness has already set in; nor will a saddle bruise, farther back on the withers, necessarily unfit him for harness.

A recent swelling should be immediately treated with fomentations of bitter herbs.

Boil wormwood, or mullen stalks, or life-everlasting in soft water, to make a strong decoction; and apply it with large woolen cloths, as hot as can be borne, to hasten the formation of matter. When the tumor begins to soften and show signs of heading, have a suitable, fine-pointed, sharp knife. Ascertain the lowest point of the abscess. Then stand close to his side, near the middle, to avoid both hind and fore feet in case of kicking or striking, with the back of the knife to the shoulder; point upward and outward, stick at the lower edge, and cut open with a free incision. Next, syringe the abscess till it is as thoroughly cleansed as possible with a solution of carbolic acid and water, one part acid to two of water. Then dress with coal oil, or some convenient salve. After two or three days, the wound should be thoroughly cleansed by syringing with warm soap suds; then use the carbolic acid water, and repeat the oil or salve dressing; and so on till a cure is effected.

The patient must in no case be turned to pasture, since the constant motion of the neck and jaws necessary to procuring and masticating his food aggravates every symptom. Stable him comfortably, and feed

according to his general condition. Let him have water freely; and give opportunity each day for some exercise by allowing him the run of a small inclosure.

When the case has become chronic, and holes in considerable number have appeared, make a cut so as to reach the bones, and to include in its course as many holes as practicable. If there are other openings, (particularly below), cut from them into the main incision. Have an assistant to press back the sides of the greater opening till the matter is cleared out; and if the spinous processes or points are found to be carious or rotten, nip off with a pair of bone forceps till the healthy bone is reached. If any of this decaying bone is left, the wound will inevitably matter and break again, though it may for a time appear to have healed.

After thus cleaning out the bulk of the matter and picking away the dead bone, use the syringe and warm soap-suds still further to clean the parts; then inject the carbolic solution as previously directed. But instead of coal oil, use this ointment once a day;

No. 29.
½ Oz. verdigris,
½ Oz. copperas,
1 Oz. oil of turpentine,
4 Oz. yellow rosin.

The copperas and rosin must be finely powdered—then mix all together thoroughly. When a kind of thick whitish discharge is observed to have set in, discontinue the ointment; but still wash or syringe thoroughly, at intervals, with warm soap-suds. To keep away flies, cover the wound, after each dressing, with a large cloth saturated with diluted tar.

Should the horse grow feverish from the effects of blood poisoning, which takes place in a greater or less degree in this chronic stage by reason of absorption, bleed him once, at least, taking from the neck vein from three to six quarts, according to general condition and severity of the inflammation.

When the disease has proceeded to the length of requiring this severe treatment, the recovery is necessarily slow, and the horse is inevitably disfigured.

In very desperate cases it is sometimes best, or, indeed, almost indispensable, to use the rowel. The pipes, (or sinuses as they are sometimes called), the openings whence the matter exudes, take a dangerous direction, and tend from the withers to the chest. Use an elastic probe, to ascertain the direction and the depth; and if it is found that cutting will not answer, use the *guarded* seton or rowel needle described in the chapter on medicines, ointments, etc. Insert it as far as it will go, then give it a firm rap on the handle, so as to force out the cutting edge and drive the point through the flesh. Knot one end of a long, slender tape,

place the other through the opening near the point of the needle and draw it through. Then tie a knot at the other end, and leave it. In this way, the sinus will have an opening below, and the tape will act as a drain, while tending also by friction to remove the hard lining of the pipe. As soon as a healthy looking matter is seen to be issuing from the lower orifice, remove the seton, but cleanse occasionally with warm soap and water.

CHAPTER III.

DISEASES OF THE GLANDS AND NASAL MEMBRANES.

I. GLANDERS.—II. FARCY.—III. DISTEMPER.—IV. NASAL GLEET.—V. NASAL POLYPUS.

I. Glanders.

Causes.—This seems to be primarily a disease of the lymphatic and nasal glands, and confined to them: but upon this point authorities disagree, and it is contended by some that all the air passages are always affected—that it is a kind of phthisic, or incipient pulmonary disorder—and that whether the ulcers appear on the membrane of the nose prior or subsequent to the formation of tubercles in the lungs does not invalidate the proposition that the earliest external manifestations are but the effects of pulmonary derangement. The most tenable conclusion, however, is plainly this: that inflammation of the membrane of the nose, and confined to that membrane, at last results in ulceration; that the matter discharged from these is poisonous, and acts upon the glands by means of the absorbents with which it comes in contact, and is also inhaled into the lungs with the air as it passes through the nasal cavities, till at length both the circulatory and the respiratory systems are generally diseased.

Whence this poison is derived is not at all clearly defined. The disease is both spontaneous, (bred in the horse), and contagious; but it is doubtless due far more frequently to predisposing cause than to contagion. It is found as a prevalent disease where neglect, filth, and foul atmosphere exist; and we may reasonably conclude that poisonous inhalations, acting upon the delicate and easily irritated membrane of the nose, produce that incipient ulceration from which the subsequent general poisoning proceeds. In close stalls, the carbonic acid given off from the lungs, (which gas is of a deadly poisonous character), passes again and again

into the lungs, mixed with other impurities of the stall itself; this, acting perhaps more readily upon the nasal membrane than upon the other linings of the air passages, produces inflammation. This inflammation may long exist, and unsuspected by the ordinary observer, till some intense action is set up, when ulceration takes place.

Or it may be produced by anything that injures and weakens the vital energy of this membrane; as violent catarrh, accompanied by long continued discharge from the nostrils; a fracture of the bones of the nose; and the too frequent injection of stimulating and acid substances up the nostrils. Everything that weakens the constitution, may, under peculiar circumstances, produce glanders. Among the hurtful influences that may operate to this end we may enumerate: hardships and an exhausted constitution; any interference with the due elimination or throwing off of morbid and waste matter from the system; want of regular exercise; sudden and violent exercise when the horse has not been previously prepared for it; placing a weak and worn-out horse upon a course of diet that is too nutritious and stimulating; and hereditary predisposition to certain forms of disease.

One point is deserving of special mention: it is sometimes present and contagious in animals apparently in fine bodily condition; other horses may contract the disease from such a one and die of it while it is still difficult to discover unmistakable traces of it in the first. There may be inflammation, and minute ulcers so far up the nasal passages as not to be seen; these little hidden ulcers may discharge so small a quantity of matter as to escape notice, and yet the matter is so poisonous that when it comes in contact with any thin and delicate membrane, by which it may be absorbed, it will produce glanders. Weeks, and even months, may intervene between the first existence of inflamed membrane and the development of the disease. In this case there may be counteracting tendencies, requiring some violent action or sudden change to determine the issue.

It must be observed that its infectious nature is not general, but particular—depending upon inoculation with the matter exuded from glanderous ulcers, or at least from poison received in some way from the glandered animal and communicated directly to a wound or to some delicate membrane of another horse, an ass, or a human being.

How to know it.—As may be inferred from the preceding, it is not always easy to detect the actual presence of this disease, though it is often a matter of paramount importance that it should be known. Its dangerous character as an infectious disorder makes it essential that it should be known in its very earliest stages, that the proper precautions may be taken to prevent the infection from spreading.

There are some symptoms that may be observed, even before the appearance of any discharge whatever; and these may be described, though they may sometimes prove fallacious, and are found to be but extraordinary indications of some other disease.

The first signs are those of heaviness, dullness, followed by fever; the eyes are red and unhealthy looking, while the light is seemingly painful to them. The hair is one day dry, the next, perhaps, it resumes its natural appearance, and so alternating until after awhile it becomes staring and unnatural. The flesh wastes away rapidly for a time; then, and particularly if a change of food is introduced, showing some improvement, and so alternating till at length he begins to show signs of permanently failing health and of a general debility.

These may be regarded as for the most part premonitory signs, and up to this time there may be no appearance of tumors and no discharge from the nostrils; but the animal should be subjected to the most rigid scrutiny, to discover whether there is anything to confirm the impression made by the symptoms enumerated as to the probable existence of glandered condition.

After these manifestations there may be said to be three stages of the disease, the peculiarities of each of which, in so far as they are distinctly defined, are generally as follows: In the first stage the discharge so much resembles that which attends some other nasal affection as sometimes to pass unnoticed, but examination will disclose a curious fact which has not been accounted for,—it will be found confined to one nostril, and that, in the vast majority of cases, the left. Occasionally it is the right, very seldom both. This, however, must not be regarded as a peculiarity of the first only, as it is common to every stage of the disease.

The second stage is characterized by an increased flow, and it also becomes more mucous and sticky, while its color changes from an almost transparent clearness to a whitish or yellowish tinge. It often begins now to drip from the nose in stringy clots. Some of the matter in this stage, now more actively poisonous, being taken up by the absorbents, affects the neighboring glands. If both nostrils are discharging, the glands within the under jaw will be enlarged on both sides; if from one nostril, only the gland on that side. As other diseases will produce these swelled glands, as catarrh, for instance, it becomes necessary to look for some peculiarity in order to determine certainly as to the existence of glanders. At first the enlargement may be spread over so much surface as not to make any distinctly marked lumps; but this soon changes, and one or two small swellings remain, and these are not in the center of the channel, but adhere close to the jaw on the affected side.

This may be regarded as an almost conclusive test. The membrane of the nose will now be found of either a dark purplish hue or a leaden color — the latter, unless there is some of the redness of inflammation; and ulcers will probably appear upon the membrane, usually approaching to a circular form, and deep, with abrupt and prominent edges. When these appear there can be no further doubt, but care must be taken to know that they are not spots of mucous. To this end, try whether they may be brushed away. Notice particularly, too, that the orifice of the duct which connects with the tear glands is just within the nostril, and on the inner side of it; otherwise, this, if foul, may be mistaken for an ulcer. This orifice may be readily distinguished from an ulcer by observing that it is on the continuation of the common skin, while the glanderous ulcers are on the membrane of the nose.

When these ulcers begin to be visible, the general condition of the animal soon shows signs of change; his coat seems dead and staring, the hair coming off easily; his appetite is impaired; he loses flesh; his belly contracts; he grows more and more debilitated: there is more or less cough; the discharge increases in quantity, and its increased poisonous character causes it to remove the hair where it flows, while it seems tinged with blood, and is offensive to the smell.

In the third stage the ulcers have become larger and more numerous; and upon placing the ear to the horse's chest, a grating, choking noise will be heard at every act of breathing. The air passages being obstructed, every breath is drawn with difficulty. The skin of the forehead will be found somewhat thickened, swelled, and peculiarly tender; the membrane lining the frontal openings of the nose will be not only ulcerated but evidently inflamed; the discharges are increased and become more sticky and of darker color, though still somewhat flecked with blood. The absorbents become more and more involved; it seems now that general ulceration has set in; and the additional symptoms are henceforth those of farcy.

To prevent its being mistaken in its earlier stages for strangles, which is sometimes done, the following directions will suffice:

Strangles is peculiar to young horses, and at the outset resembles cold with some fever and sore throat, accompanied generally by distressing cough and some wheezing. The enlargement which sometimes appears beneath the jaw in strangles is not a single small gland, but a swelling of the whole substance between the jaws, growing harder toward the center, and at length, if the disease runs on, breaking. In strangles the membranes of the nose will be very red, and the discharge from the nostrils profuse and mattery almost from the first. When the tumor has burst, the fever will abate and the horse will speedily get well.

To distinguish it from catarrh, for which also it is sometimes mistaken, observe that fever, loss of appetite, coughing, and sore throat all accompany catarrh, whereas these symptoms are rarely if ever found together in glanders. In catarrh, the horse quids his food, (drops it from his mouth partially chewed), and gulps his water. The discharge from the nose is profuse and sometimes mattery; the glands under the jaw, if swollen, are movable, while there is a thickening around them and they are hot and tender.

What to do.—The first thing to do, and in the first stage, will naturally suggest itself to any one who has taken the pains to inform himself of the dreadful nature of the disease. Its contagious character renders it dangerous, as has been said, not only to all of the horse kind but to man; and no time should be lost in removing a glandered animal from the possibility of communicating the disorder to another. If stabled, there should be no connection whatever between his stall and those of other animals, as the discharge from the nostril, (in which lies the danger), may be communicated through any opening sufficient to allow horses to bite or nibble at each other. If placed to pasture, it should be known that no other horse is at all likely either to be turned in with him or to approach the inclosure. And this removal or separation should take place whenever it is observed that there is that constant discharge from one nostril which has been described, even though it may seem but watery and natural, and the horse be in the very best apparent condition. Remember that a glandered condition may long exist, and minute ulcers, in the hidden recesses of the nose, discharge a sort of limpid or clear fluid, without any of the active and violent symptoms being manifest; but that all this time the horse may be able to communicate the disease to others; and that these may die of it while he is yet in reasonably fair condition.

It can hardly escape the intelligent horse owner that every known cause of the disease should, if possible, be promptly removed. Close, damp, dark stables, reeking with exhalations distilled from mingled dung, urine, and rain water, ought at any rate to begin to receive a little attention after the poor occupant has caught what is more than likely to prove his death; if he is jaded and exhausted by labor, no hope of cure can be entertained unless he is promptly released from his toils and put upon moderate and health-giving exercise only, with such generous diet as will restore the wasted tissues; if, on the contrary, he is pampered and stimulated and grown unwholesomely plethoric for want of labor proportioned to his good keeping, his food should be gradually changed, and a regular course of moderately increasing exercise be instituted and

persevered in till that point is discovered at which such exercise is recuperative rather than exhaustive, and then maintained.

It may be well, before proceeding farther, to caution the reader against the advice of quacks, and point out what *not* to do. This may be summed up in the one single injunction, *do nothing cruel*. All such practices as slitting the nose, scraping the cartilage, searing the glands, firing the frontal and nasal bones, and injecting mustard, capsicum, vitriol, and corrosive sublimate up the nostrils, are but the hurtful devices of ignorance combined with brutality.

If the disease is in its first stage when the horse is taken in hand for the purpose of employing remedial agencies, place him in a good, dry and airy stable, if in Summer, or in an open pasture where most of his food may be obtained by himself, observing the precautions already laid down. If in Winter, he should still have the dry stable, not too close, and supplied with clean litter, and care should be taken to guard him against severe cold and exposure to any sudden change. The matter of food may be regulated by this: it must be nutritious without being inflammatory; and the condition of the animal as to previous treatment and present condition of flesh must regulate the quantity, as also to some extent the quality. Then prepare and administer the following medicine:

No. 30. 1 Drachm powdered sulphate of camphor.
4 Fluid drachms Fowler's solution of arsenic.

Mix with linseed meal and syrup to form a ball, and give one of like quantity each day for three days; then omit a day; then give the balls for three days again, and so on till a change for the better is perceptible or its failure is manifest. Meanwhile, swab out the nose every day with a solution of pyroligenous acid—using warm water, (as warm as the horse can well bear), and putting in sufficient of the acid at first to make the solution of medium strength. It should be a little increased from day to day; but care must be taken not to make it too strong, as violent acid injections or swabbing solutions are calculated to do harm rather than good. A good mop for this purpose may be made by attaching soft rags, (old cotton cloth is best), to a light stick, two feet in length—so arranging the cloth as to have it project beyond the end of the stick to be inserted, to prevent any roughness that might abrade or scratch the membrane, and fastening very securely, to prevent its slipping off.

If this treatment is found not to be efficacious, or if the disease has already developed into the second stage—the discharge more mucous, sticky, and stringy, with glands swollen and the membrane of the nose of a dark purple or leaden color—adopt the following treatment, and carry it out energetically and persistently:

Take from the neck vein from three to six quarts of blood, according as the horse may appear feeble or plethoric. Make a gallon of very strong decoction or tea of tobacco leaves, which keep ready for use. Put enough of this into warm water, (as warm as the horse can well bear), and swab out his nostrils with it, as high up as possible, using mop as just directed. Then put a gill of this same strong tobacco tea into a pint of warm water, and drench him with the solution. There must be no uneasiness on account of the dreadful sickness which this will produce. The tobacco is necessary thoroughly to relax the system and overcome fixed or chronic tendencies, and to counteract the influence of the glanderous poison. Swab out the nose every day for eight or ten days, and drench every third day for from two to four weeks, or until the discharge has ceased and the ulcers are perceptibly healing.

So for the first two stages. If all these directions, (those as to food and care as well as for the administering of medicines), are faithfully carried out, a reasonable hope of success may be entertained. If the disease has passed into the third stage, however, no treatment can be confidently recommended. So doubtful is it as to whether any remedial agencies will avail, that most veterinarians in the United States confidently declare that the best thing to do is to kill the sufferer in the quickest and most humane way, and bury him deep in the ground, beyond the possibility of his contaminating the atmosphere with his decaying and poisonous carcass. This is made a matter of legislative enactment in England—severe penalties attaching to the keeping of glandered horses —and it is contended by some that the general safety of both animals and man require like legal enactments in this country; but, as we have said, until he has passed into the third state, or where he seems to be suffering with both glanders and farcy, a good horse ought not to be sacrificed. It cannot be too strongly urged, however, that no effort ought to be spared to prevent the spread of the contagion; and the man who would expose a horse for sale, known to him to be glandered, but not apparent to a casual observer, ought to be confined in the State prison.

A horse affected with this disease, in any stage, is dangerous to the man who handles him; but he is doubly so, perhaps, when he has become a loathsome object in limbs and body as well as in head; and under ordinary circumstances it is doubtless best to destroy him as quickly as possible. In case treatment is determined upon, nothing better than that prescribed for the second stage can be recommended.

The reader's attention ought to be called to this fact: that there have been instances of a spontaneous cure of glanders—that is, of cures having taken place without the agency of remedial means used by man;

but all such cases may have been apparent rather than real—a mere suspension of the active powers of the poison—and they ought to be looked upon with suspicion. These may be resumed at some future time and with fatal result.

It remains now but to suggest some precautionary measures to prevent contagion, in addition to those which have already been given. If a stable is known to have been used by a glandered horse, no other animal should be allowed to occupy it until the trough, the rack, and the walls have been thoroughly scraped and scoured with strong soap and warm water. Then take one pint of chloride of lime and dissolve it in two gallons of water, with which thoroughly saturate every part that the horse's nose may have touched. Next, white-wash the walls inside. Then burn bridles, halters, buckets out of which he has drunk—whatever may have been about his head—and if any blanketing has been used have it carefully cleansed by washing, or burn it up.

II. Farcy.

Causes.—In treating of glanders and farcy there is a great diversity of opinion as to the relations in which they stand to each other—which is the antecedent, which the consequent; but the most sensible view of the matter, and the one taken by the ablest veterinarians, is this: that the two are but different manifestions of the same disease, and that they might with propriety be so treated. Regarding them separately it is difficult to say which is the more acute form, which the more chronic, as it is now generally conceded that a horse afflicted with what may seem at first a well-developed case of glanders may be presently laboring under confirmed farcy—the last state apparently worse than the first; again, a case of farcy may assume the type to which the name glanders is applied, and in this case also there seems to be a development of the first into a more hopeless disorder.

This would be a matter, however, of no special consequence to the intelligent horse owner were it not that the confused notions of men concerning the two affections might chance to bring him face to face with this difficulty: that, unable to eliminate the truth from the tangled statements of some who, entertaining diverse views, may take it upon themselves to advise, he may find himself halting between two opinions when it is of vital consequence that he should be doing something. Let him be assured that it is wholly unnecessary to trouble himself with nice questions as to the priority of either disease or the real difference between them; the one important point for him is to be able to detect in the incipiency of an attack of either that *one of them* is present.

Speaking now of the farcy as a distinct disease, it is to be regarded as a general poisoned condition of the horse—the poison having its immediate origin in an ulcerated condition of the lymphatic glands; and its remote origin in whatever tends to disorder these lymphatics. The remote causes are often found in constitutional or inherited tendencies, but more frequently, no doubt, in neglect and abuse—some of the forms which these take on being overwork and under-feeding; lack of the curry-comb and brush; exposure to the foul atmosphere of dark, damp stables, and their accumulations of filth.

The glands so affected are more numerous along the jaws, neck, and flanks than elsewhere near the skin. Some species of poison is taken into the system of the animal, which manifests itself by an enlargement of some of these glands into the hard, rounded lumps, called *farcy-buds*, or *buttons*, which presently secrete and discharge dangerous infectious matter. The absorbents whose office it is to remove useless particles from the body, take up from beneath the skin some of this virus; they inflame with it and swell; and by their connection with the veins give the latter a corded, swollen appearance. The poison, of course, finally reaches the veins and is mingled with the blood; by the blood it is conveyed to every part of the system. Acting upon the valves of the veins—those little membranous sacs which assist in giving the blood a uniform tendency towards the heart—the poison creates new knots or buttons, and thus they increase until many portions of the skin are covered with putrid ulcers

The first existence of an ulcerous condition may not be upon any visible portion of the body. Minute poisonous ulcerations may arise in the recesses of the nose, and discharge so slightly as to escape observation until the general system is thoroughly inoculated with the virus.

It is, however, extremely capricious in its manifestations; probably owing more to the peculiarities of different animals than to any difference as to either immediate or remote causes of the disease itself. It occasionally takes on a lingering form, and will continue for months and years; again it will run its course and kill the horse in an incredibly short time.

It is extremely contagious in all its stages, and is communicable not only to other brutes, but to man.

How to know it.—It is difficult to give in few words such directions as enable the unprofessional and inexperienced reader readily to detect this disease in its incipiency, and to distinguish, in its somewhat advanced state, between it and some other diseases which have, occasionally similar manifestations. It often perplexes by the different forms it assumes; but close attention to the following particulars and a wide-awake interest,

that leads one to observe changes and peculiar conditions will probably suffice:

In some cases the horse will droop for many days before the appearance of either buds or corded veins; the appetite is impaired; the coat is staring, or rough and unpleasant to the sight; his mouth is hot; his thirst great and difficult to quench; the urine is highly colored; the hair comes off easily; and he evinces then the symptoms of a generally deranged condition.

Sometimes the horse will appear to be perfectly well at night, and next morning one leg, usually the hind leg, will be fearfully swollen, hot with fever, and almost without the power of moving.

At other times the head will swell, the muzzle, particularly, will be enlarged, and an offensive discharge proceed from the nose.

Again, this tendency to the swelling of the leg is accompanied by cracks at the heels, leading the inexperienced to mistake it for ordinary "swelled legs" or for "grease."

When taken by inoculation, (the poison having been received from another animal or from trough, stable, or curry-comb), it is apt to manifest itself in its earliest stages by shivering, followed by heat of body, a frequent and hard pulse, dullness, accelerated breathing, and rapid elevation of temperature. These attacks may speedily prove fatal.

In all these cases, the poison has been working, but is not yet outwardly manifest. Generally the first stage of unmistakable local manifestation is a swelling of the lymphatics, a development of the "farcy-bud." A single bud will sometimes appear near the pastern joint and run up in an uneven knotty form. They usually appear, however, along the sides of the neck or inside the legs, and are rounded, with an elevated edge, and a pale surface. These presently burst and discharge a watery fluid for some time, when a change takes place and the discharges become more mattery and offensive, and are mixed with blood. They frequently increase in number until the neck, shoulders, and legs are almost entirely covered with them—sometimes almost the whole body becomes a putrid loathsome mass. In this last case there are no longer any buds or knots, as the veins have become so generally injured as not to show special prominences at the valvular points.

Occasionally it will be found that the buds will not ulcerate, but become hard and difficult to remove. This indicates that the progress of the disease is suspended; but the poison is in the system, and if steps are not taken at once to eradicate the seeds of the malady, it will in time break out and destroy the horse.

When it rises along the spine, as it occasionally does, it is to be considered malignant and very dangerous, particularly to those horses

that are fat and full-blooded—the disease in this case being most probably the result of infection.

To enable one to distinguish it from those diseases for which it is sometimes mistaken, the following directions, if closely observed, will be sufficient:

It differs from surfeit in this: that the buds are generally higher than the surfeit tumors, more knotty, not so broad, and are found principally on the inside of the limb and not on the outside.

The sudden swellings of the legs, head, or chest are characterized by heat and tenderness that do not accompany other enlargements; and the farcy may be distinguished from grease or swelled legs by this: that in grease there is usually a peculiar tightness, glossiness, and redness of the skin, with scurfiness, discharging cracks, and a singular spasmodic catching up of the leg. In farcy the swelling is more sudden—the leg that is apparently sound at night is found in the morning swollen to an enormous size. It is owing to a simultaneous inflammation of all the absorbents of the limb; but instead of the redness and glossiness of surfeit there will be burning heat without outward manifestation, and the leg will be peculiarly tender, while the body will be generally feverish.

It may be known from that local dropsy of the cellular membrane producing an enlargement beneath the thorax called water-farcy, by simply observing that in water-farcy there is general weakness unaccompanied by inflammation.

What to do.—The treatment must of course be directed primarily to the removal of the blood poison and to the restoring of the assimilative powers of the digestive and circulating organs. It must be both general and local; as the vital functions are to be restored to their normal condition at the same time as the outward manifestations of the poison are removed. The buds must be dispersed and the ulcers healed by active external applications, since the powerful internal remedies must be more or less inoperative while these receptacles of poisonous matter furnish a constant supply to the absorbents, to be carried by the various organs of circulation to all parts of the body.

The first and most necessary thing to do is to exercise a wise discrimination *as to the stage of the disease*. If found to be in its incipiency—few buds having appeared, and being slow to spread; no foul discharge from the nose; no sudden swellings and violent heat—the following treatment may be adopted with every hope of success:

Pay particular attention to feeding, and to keeping the stable, (if necessary to have the animal confined), clean, dry, and comfortable. The food should be easy of digestion, but nourishing, and especially of such

a character as to keep the bowels regular. Bran, oats, long forage, (green if possible), are good; and an occasional mash of boiled carrots or turnips mixed with bran or shorts, to which a table-spoonful of salt is added, will be found beneficial. He should have moderate daily exercise; and as much good pure water as he will take should be given him. If the food given does not have the effect of keeping the bowels open, give an occasional mild purgative compounded as follows:

No. 31. 3 Drachms finely powdered aloes,
1 Drachm ground ginger.

Stir these ingredients thoroughly together; then use sufficient soft soap to make a paste that can be rolled into a ball. Wrap this in thin paper, and give by elevating his head and thrusting it into his throat.

Give the following tonic, to stimulate the digestive and secretive functions:

No. 32. 6 Oz. powdered sulphate of iron,
6 Oz. rosin,
3 Oz. gentian,
3 Oz. ground ginger.

Mix thoroughly, divide into twelve powders, and give one night and morning. When these powders are exhausted, make up the same mixture, with the exception of the rosin, which, by too long continuance is apt to affect the kidneys unduly, and give as before, night and morning.

To remove the buttons and ulcers, take a large stick or pencil of lunar caustic or of caustic potash, and with it burn out the central portion of each bud, and cauterize each ulcer. When convenient to obtain what is called a farrier's "budding iron," the work may be more expeditiously done by heating the iron to redness, and, after rubbing it on something to clear off the scales, inserting the point into every bud and ulcer—remembering that it must be done moderately, and not so as to destroy the tissues. When these burnt places begin to slough out, and look pale, foul, and spongy, with thin matter, wash them frequently with a solution of 1 drachm of corrosive sublimate in 1 oz. rectified spirits. When the wounds begin to look red, and the bottom of them is even and firm, while they discharge a thick white or yellow matter, use some simple ointment.

If the disease is plainly in an advanced stage—the buttons and ulcers numerous and widely spread over the body; the thirst great and hard to satisfy; signs of glanderous ulcers on the mucous membrane of the nose; the hair, where the sores have not invaded the skin, staring and easy to

come off; the general appearance filthy and loathsome—the following severe treatment should be adopted and perseveringly carried out:

In the first place, observe all the precautions as to diet and the state of the bowels previously recommended, being careful to guard against extensive purging, for this will tend rather to reduce the disease to a lower stage, and to retard recovery.

Bleed at once, taking from two to four quarts of blood from the neck vein, according as the body is more or less inflamed.

Take a gill of very strong solution of tobacco and pour it into a pint of warm water, and drench with it. Repeat this dose every third day until a change for the better has evidently taken place. If the feverish state continues he should be bled again, taking a like quantity as at first, within a week or ten days. The practice of bleeding, as insisted upon by some veterinarians, cannot be recommended; but there are cases in which it may be employed with the greatest advantage. In farcy, it cannot be said to remove the poison to any great extent, though it does in some measure have this effect; but the vitiated condition of the fluid seems to render it turgid and slow, and to produce an unnatural distension of the veins and capillaries, which bleeding partially relieves—possibly by both diminishing the quantity a little and by a reaction which follows the shock given to the organs of circulation by the act of blood-letting.

The tobacco drench is a powerful medicine in counteracting the poison in the system: and while the dose recommended will make the horse very sick, from its well-known nauseating properties, its effects are not to be feared.

On those days which intervene between the doses of tobacco tea, the tonic powder, No. 32, may be given as directed for the milder stage of farcy, omitting the rosin.

When the poison has been long at work without betraying its presence, till all at once the horse becomes lame, his legs swell, violent general heat sets in, large and vicious looking buds appear suddenly and presently break, while a stinking discharge takes place from the nose—corded veins and buttons appearing in some instances along the spine—the case may well be looked upon as hopeless; and if there are other animals that are in danger of taking the affection from him, it is doubtless best, as is generally recommended by English veterinarians, for even much milder forms, to kill the horse and bury him beyond the reach of all danger to others. In this stage of the disease he is dangerous to man, and no one ought to be required to take the risk of handling him.

Lastly, every precaution should be taken to guard against the spread of the contagion. When a horse is known to be affected with farcy, no

time should be lost in cleansing the stable where he has been confined—washing the trough, rack and walls thoroughly,—saturating them after that with a strong solution of chloride of lime, (one pint of chloride to two gallons of water), and then white-washing the walls inside. Curry-comb, blanket—whatever may have the poison adhering to it—had better be burned.

III. Distemper

Causes.—This is an epidemic disease, occurring in young horses, generally, and when it once breaks out all the animals in the stable are likely to be infected with it, unless they have already had it. Colts and young horses will take it from older ones more easily than older ones from the young.

If it is not actually generated by filth and uncleanness in the stables, the disease is certainly aggravated by causes producing miasma and bad air in the stables. Therefore cleanliness is essential not only as a means of preventing the disease, but in rendering it of a mild type when it breaks out

Horses will contract the disease from others when at a considerable distance. It is supposed to be communicated both by actual contact and also from germs proceeding from the breath. Hence when once it breaks out, at the first symptoms, isolate the sick animal or animals, fumigate the stable thoroughly and daily.

To do this fill the stable with tobacco smoke, both the stable from whence the sick horses have been taken, and the place where they are confined during treatment. Let the smoke be so thick as to become quite inconvenient. Make all the animals inhale as much as possible. Wash every part of the stable, and especially the feeding places and hay racks, with a strong decoction of tobacco stems, using for the purpose cheap, rank tobacco. Keep powdered tobacco leaves in the mangers of all the horses. This being early attended to its spread may be generally arrested.

How to know it.—The disease has three stages. In the early stage of the disease there is a dry, hacking cough, and there will be noticed a discharge from the nose, first of a thin, watery fluid succeeded by a thicker, purulent discharge of a whitish color.

The next stage of the disease shows itself in a swelling of the throat. The salivary glands, which at first were inflamed, are now closed, and pus is being formed. At length an abscess is formed.

The third stage is the suppurative stage, in which the abscess breaks;

sometimes there are two. From this time on, the animal is in a fair way to mend, and every means should be taken to promote the discharge. In bad cases the suppuration may continue for weeks, and in extreme cases it may continue for months.

From first to last there is a fever. The pulse is quickened and hard. The appetite fails, both from the fever and inability to swallow. As the fever increases the eyes become dull and glassy: the hair is dry, will not lie close, looks dead; and the animal stands with its head drooped, and the whole appearance is stupid.

What to do.—In some cases, bleeding will be indicated. This, however, should not be allowed except under the advice of a competent veterinary surgeon or physician. If the animal is fat, or if there are indications of blood poisoning, from a quart to three pints of blood may be taken from the neck vein. The animal must be warmly clothed and kept in a thoroughly well ventilated but comfortable stable. Let the food be light, but nourishing. Mashes made of oat-meal and bran; also boiled oats; oat-meal gruel, and hay-tea should be given for drink. Give the following:

No. 33.
1 table-spoonful pulverized gum myrrh,
1 table-spoonful gum powder,
1 table-spoonful lard,
1 table-spoonful soft-soap,
2 table-spoonfuls tar.

Mix, and put a spoonful of this mixture on a long, narrow paddle down the throat twice a day, so it will lodge about the glands of the throat.

Let all drink and food have the chill taken off before giving it. If there is considerable fever and the tongue is coated, give a little cream of tartar in the drink. If the limbs are cold, bandage them and hand rub to promote circulation. Give once a day in the food the following:

No. 34.
2 or three ounces flower of sulphur,
1 ounce resin.

To be mixed in the food if it will eat, or in the drink. Give also three ounces of sulphur per day, if the animal will take it. Wash the neck two or three times a day with a decoction of tobacco as hot as the animal will bear it. If these remedies are taken in time and faithfully applied, they will often prevent any tumor from forming. If the tumor forms, then every means must be employed to cause it to suppurate. It will then be dangerous to scatter it. If the bowels are obstructed, remove the contents of the rectum by the following injection:

No. 35.
4 Drachms powdered aloes,
1 Drachm common salt,
2 Drachms hot water.
Mix, and inject when blood-warm.

Use every possible means to promote the formation of pus and its discharge. Common distemper and strangles are similar in some of their symptoms, and one may run in the other. Stimulate the swelling with the following:

No. 36,
Two parts spirits of turpentine,
One part laudanum,
One part spirits of camphor.

EIGHT-TAILED BANDAGE.

Apply this three times a day with a brush until soreness is produced. After each application keep the parts warm with folds of flannel, kept in place with an eight-tailed bandage, a piece of flannel having three slits cut in the ends for tying, and long enough to go round the throat and tie over the top of the head.

If this does not cause the tumor to form, prepare a poultice as follows:

No. 37.
1 Part powdered slippery elm,
1 Part poplar bark,
1 Part ground flax seed.

Moisten with vinegar and water equal parts, quilt between two folds of cloth and apply to as large a surface as possible. When the tumor has formed pus and is nearly ripe, which may be known by a soft place where it is working its way to the surface, open it with a knife with a round-pointed blade, and if necessary increase the opening with a button-pointed bistoury, to allow free exit of matter. It will give almost immediate relief. Then apply to the swollen glands night and morning, the following:

No. 38
4 Ounces spirits of camphor,
3 Ounces pyroligneous acid,
1 Pint neat's foot oil.

Mix. If the acid is not to be easily obtained use strong cider vinegar. Prepare the following powders:

No. 39.
2 Ounces powdered gentian,
1 Ounce powdered golden seal,
1 Ounce powdered pleurisy root,
1 Pound powdered liquorice root.

Mix, and divide into six powders, to be given in the food night and morning.

IV. Nasal Gleet.

Causes.—This affliction sometimes follows distemper and strangles and is one of the attendants on glanders, sometimes running into it. It is sometimes caused by a chronic affection of the schneiderian surfaces. It is caused sometimes by the relaxing and enlarging of the ducts communicating between the cavities of the mouth and nose by disease, allowing the semi-liquid food and its juices to pass into the nostrils. This is true chronic gleet, and the discharge is tinged with what the animal eats. It is in one of its forms a suppuration of the mucus membrane lining in the facial sinuses, producing distortion and a terribly offensive discharge, which may have been produced by a blow on the face. In bad cases the cheapest way is to end the animal's misery by killing.

How to know it.—Discharge is not always present, neither is it uniform. Sometimes during fair weather it will be discontinued. The discharge is a thick yellow mucus tinged with green, if the food be grass, or with the color of the food. If it becomes purulent, that is pus, matter, and tinged with blood, it may end in ulceration of the cartilages of the nose, and in glanders. If the discharge is confined to the left nostril, is tenacious, elastic, accumulates around the edges of the nose, if there is enlargement of the lymphatic submaxillary gland, under and on the side of the jaw, it is cheaper to kill the horse, or else call in a surgeon, since for the proper treatment of the disease the trephine should be used, by which a circular piece of the bone may be taken out to facilitate treatment.

How to Cure.—In mild cases look for decayed molar (grinding) teeth; if found, remove them. Look for swelling of the frontal bone, produced by bruises. Put the horse where he may be comfortable, let his diet be light, but soft; fresh grass in Summer, with good food. Inject the nasal passages thoroughly with the following:

No. 40. 1 Ounce bayberry bark,
1 Pint boiling water.

When cool strain through a close linen or white flannel cloth, and inject daily.

Prepare the following:

No. 41. 1 Part Grains of Paradise,
1 Part white mustard seed,
1 Part powdered sulphur,
1 Part powdered charcoal.
Mix, and give one ounce daily in the food.

Give occasionally in gruel the following:

No. 42. ½ Ounce balsam copaiba,
2 Drachms sweet spirits of niter.

This with warm clothing and nutritious food will suffice for mild cases. Where the trephine is not to be used, treatment must be persisted in until the animal is cured.

V. Nasal Polypus.

Polypus may form upon any of the cavities of the body which communicate with the air, being peculiar to the mucous membrane. These grown to such size as seriously to impair breathing, are accompanied sometimes by discharge of mucus which is pure. That is, it is thrown out as soon as formed, and therefore it is not fetid.

What to do.—If the polypus which is generally pear-shaped and attached to the membrane of the nose, by a small neck, can be made visible by causing the horse to cough, it may be removed by a ligature or a pair of polypus scissors by any physician, if no veterinary surgeon is at hand.

When the polypus is entirely concealed from view, tracheotomy may have to be employed before an examination can be made, since the polypus may have gone so far as to oppress the breathing. Thus in all cases of polypus, unless it be so low that a ligature can be employed to strangulate it at the neck, it is altogether better to call in the aid of a veterinary surgeon.

CHAPTER IV.

DROPSICAL AFFECTIONS.

I. DROPSY OF THE HEART. —— II. DROPSY OF THE BRAIN. —— III. DROPSY OF THE CHEST. —— IV. DROPSY OF THE SKIN OF THE CHEST. —— V. DROPSY OF THE SCROTUM. —— VI. DROPSY OF THE ABDOMEN.

I. Dropsy of the Heart.

Causes.—The pericardium or membranous covering of the heart is subject to inflammation; by this inflammation and consequent obstructed circulation in the minute vessels that supply it an effusion takes place, and either thickens the walls of the pericardium itself, and thus contracts or compresses the heart, or it is deposited in the cavity of the pericardium in quantities varying from a pint to a gallon. This diseased condition is generally found in connection with dropsy of the chest or abdomen.

How to know it.—In the early stages of the disease there is a quickened and irregular respiration, with a bounding action of the heart. As the fluid increases the action of this organ becomes feeble and fluttering. There is a peculiar expression of anxiety and alarm on the countenance of the animal. If he does not die of the disease before the pericardium is filled, violent palpitations and throbbings characterize the advanced stage. The breathing becomes difficult, and when the head is raised there is a tendency to faint.

What to do.—If it is observed while there is yet a painful state of the pericardium by reason of inflammation—profuse effusion not having taken place—the first thing is to reduce the inflammation and allay the pain, and thus forestall the further accumulation of the fluid. For this purpose relieve constipation, which is usually found as an accompaniment, by moderate doses of salts, or of oil. Then give the following draught:

No. 43. 1 Oz. nitrate of potash,
15 Drops tincture of aconite,
1 Pint of water.

The animal must be kept comfortable, according to the season, and have a plentiful supply of fresh air and cold water.

If there are no indications of relief within four hours, give the following draught:

No. 44. 4 Oz. solution of acetate of ammonia,
10 Drops tincture of aconite,
12 Oz of water.

Repeat this after eight hours, and then leave off the aconite, but continue to give, at intervals, the acetate of ammonia in water.

If the disease has reached an advanced stage, and the cavity of the pericardium is largely filled with water, it is scarcely to be hoped that the animal may be saved; but even in that case the course here prescribed should be adopted, unless there is some more general disorder under such treatment as will render it unnecessary or objectionable.

II. Dropsy of the Brain.

Causes.—The remote cause of this disease (known also as hydrocephalus), is some constitutional disorder of the brain, or of its membranous covering—chiefly, as is believed, a scrofulous tendency. The immediate causes, or the excitants to its development, are various, as castration, foot puncture, staggers, acute diseases of the stomach, defective nutrition, etc.

How to know it.—At first an unnatural sleepiness will appear, with apparent unconsciousness and a tendency to reel when moving on foot. The pupil of the eye is perceptibly dilated; the animal breathes in a hard and grunting way; he tosses his head about and throws it upward or backward, as though in much pain. When down, with neck lying prone, as is often the case, he will sometimes raise his head, then drop it spasmodically, beating it upon the ground. If unrelieved, convulsions finally set in, and death ensues.

What to do.—If the head is hot with fever, denoting an acute attack, sponge frequently with cold water, and see that the bowels are kept moderately open. If there is decided constipation, as is sometimes the case, use an injection of soap-suds at intervals, until the bowels are moved. Then give the following in doses of 2 ounces, morning and evening:

No. 45. 4 Oz. fluid extract of buchu,
2 Oz. iodide of potassium,
6 Oz. water.

Continue this, keeping the horse from labor and as quiet as possible, until all symptoms of feverishness disappear from about the head, and the unnatural torpor no longer manifests itself.

III. Dropsy of the Chest.

Causes.—This disease, (called also hydrothorax), is frequently the sequel of pleurisy, and is the result of the inflamed condition of the large surfaces of the covering of the heart and lungs. The absorbents are inadequate to the taking up of the abundant effusion, so that the chest is filled, the lungs are pressed upon and death by suffocation follows.

How to know it.—The impaired appetite and chilliness of the ears and legs which characterize the last stage of pleurisy, change when it is about to assume a dropsical form, and the horse becomes more lively, his appetite returns, his legs and ears become warm, the eyes look more cheerful, and his manner is every way more encouraging. A few hours after this first apparent improvement, however, the breathing becomes labored, the muscles quiver and twitch, and the nostrils flap. The animal stands with the legs wide apart, head low, or resting upon something, neck stretched out, eyes staring, and the motion of the flanks increased, even brought into forcible heaving action. The pulse is more frequent, but small, irregular and fluttering; and the nose, ears and legs become cold again. His weakness rapidly increases, and if not relieved the animal dies, sometimes within a week, though he may linger much longer.

The disease may be detected in its early stage, or immediately after the horse has shown signs of relief from pleurisy, by placing the ear to the chest, near the breast bone. If the dropsical effusion has set in, the ear will detect no sound, nor will any be detected until the ear is placed high up the shoulder or flank, past the middle of the ribs. Holding it here, at the point where the breathing is first audible, and directing a slap to be made on the other side with the open hand, the examiner will hear a dull, splashing noise as though of disturbed water; and there need be no longer any doubt as to the nature of the case.

What to do.—In the first place adopt the use of diuretics and laxatives, that the various organs may be assisted in carrying off the accumulated fluid. For the first day give every six or eight hours, the following:

No. 46. 4 Drachms powdered nitrate of potash,
1 Fluid ounce tincture of cardamoms,
10 Oz. water.

Mix the potash and water, and when a clear solution is formed add the tincture, and give from the bottle twice or thrice in the twenty-four hours.

On the second day, two or three times a day give:

No. 47. 2 Fluid ounces solution of acetate of ammonia,
1 Oz. nitrous ether.

Mix with water and administer from the bottle.

If this treatment does not seem to be giving relief at the end of three to five days, draw off the liquid by tapping the chest. It is a simple and safe operation and will give relief unless treatment has been too long delayed, so that there is an accumulation of substances that will obstruct the mouth of the canula and prevent the flow of the liquid. The instrument to be used, the trocar, armed with a stylet, must not be large, as drawing off the water too suddenly would prove fatal. The smallest of those made for human practice is large enough, but it must be of greater length. Having the instrument, and that in good condition, select a place behind and about on a level with the elbow, and take a small portion of skin, between the eighth and ninth ribs, which must be pulled forward. Then make a narrow slit with a sharp knife upon the place which the skin originally covered. Still holding the skin gathered forward, insert the armed trocar into this opening and press it with such force as suffices to push it gradually onward until resistance ceases. It is then within the cavity of the thorax, and the stilet must be withdrawn, whereupon the water usually begins to flow out. Take all the water you can get if the horse will suffer so much to be withdrawn; but if at any time during the operation he shows signs of faintness, withdraw the trocar and let the skin fly back. It is necessary always to have the skin drawn forward so that on returning it may cover the wound lest the air may enter the chest from the outside, which would prove quickly fatal. In an hour or two after the first attempt a second may be made but the trocar must be inserted in a new place, as the first wound might be irritated by an effort to re-insert the instrument.

There is sometimes apprehension lest this operation may injure an artery by approaching too near the posterior border of a rib, but this is groundless, as the artery is protected by the groove through which it travels.

If the trocar is properly inserted, and no water flows, the case may be regarded as well nigh hopeless. A whalebone may be inserted to break away the pus or whatever substance may line the thorax, but this is not known to have ever resulted in any good.

If there is fluid on both sides, it should be drawn off on both sides at the same time, to prevent pressure upon the delicate divisions of the chest. The fluid is generally confined, however, to one side.

The operator should stay by the animal during the slow abstraction of

the water, so that upon any sign of faintness he may withdraw the trocar and prevent death through sudden collapse.

After the water is pretty thoroughly drawn off, be careful to give the patient as much nourishing and carefully prepared food as he will consume; and the following tonic ball should be administered night and morning for several times on alternate days:

No. 48. 1 Drachm iodide of iron,
½ Grain strychnia,
¼ Drachm sulphate of zinc.
4 Drachms extract of gentian.

IV. Dropsy of the Skin of the Chest.

Causes.—This is an effusion of fluid underneath the skin of the chest; and it is a sequel to various diseases—beginning generally to manifest itself only after the animal is reduced to a debilitated state. It is most likely to occur in the Spring and in the Fall of the year, at the time of changing the coat.

How to Know it.—A swelling appears on the chest and somewhat between the forelegs; and its dropsical character may be known by its yielding to pressure of the fingers with a fluctuating feeling.

What to do.—If it is the accompaniment of any more general disorder the first thing, of course, is to remove that primary disease. Meanwhile if the fluid accumulates in any considerable quantity, draw it off with the trocar; and if there is not too much soreness, subject the part to regular and moderately vigorous friction occasionally for some days.

Diuretics are always good in these dropsical complaints. No. 45 is good. It is important that the bowels be kept regular, and that good nutritious food, as boiled oats or boiled barley, with wheat bran, be given regularly, and in sufficient quantity to nourish well. Give 4 drs. of gentian every other day for a week or two.

It must be remembered that these medicines are to be given only in case there is no treatment in progress for a more general disorder.

V. Dropsy of the Scrotum.

Causes.—This is usually found in connection with dropsy of the abdomen, and arises from either local injury and consequent inflammation, followed by effusion, or by sympathy from that cause which has produced the general abdominal trouble.

How to Know it.—It is readily known by a chronic distension of the part, except when mistaken for scrotal hernia or rupture, from which it

may be distinguished by its not passing back with a sudden movement, when pressed with the fingers, but with a steady current and gradual diminution.

What to do.—If it is associated with dropsy of the abdomen treat that first, and until it is relieved, without which being done it is unnecessary to attempt the cure of the more local and dependent disorder. In any event, find out, if possible, and remove the primary cause. Next see to it that the bowels of the patient are kept moderately active; and as in the case of dropsy of the abdomen, give sufficient of diuretic No. 45, to act freely upon the kidneys.

If the fluid has accumulated in any considerable quantity, so as to render the scrotum painful by distension, draw it off with a fine armed trocar, or a hypodermic syringe, and support the parts with an elastic bandage.

VI. Dropsy of the Abdomen.

Causes.—This is a collection of water in the abdomen which is generally the result of chronic inflammation of the peritoneum, a tough, white membrane which lines the abdomen and embraces the bowels in its folds. When this inflammation has assumed a chronic condition, the peritoneum secretes a watery fluid, because of long obstructed circulation, which fills the cavity, and unless attended to will finally cause death.

Frequently it follows injuries of the abdominal walls, when the peritoneum has been subjected to violence, and is associated with local inflammation of the muscular tissues, from which effusion is directed inward.

Sometimes it arises from obstructed circulation caused by diseases of the liver, lungs or heart, and again from a poor, watery state of the blood, superinduced by exhaustion or by scanty and innutritious food.

It is more frequently found in old than in young and vigorous animals.

How to know it.—Generally, a low state of health precedes the more unmistakable manifestations: there is thirst and loss of appetite; the pulse is hard and small; the membrane of the nose is pale; the mouth is dry; the head droops; there is a condition of weakness and languor; and there are some signs of heart and liver diseases; pressure upon the abdomen is so painful as to cause a groan. Sometimes there is local dropsy of the sheath, legs and breast, as well as of the belly. The bowels are apt to be constipated, but are sometimes irregular; and the coat is loose and staring.

When the water has begun to fill the cavity, the horse manifests a desire to lie down and remain long in one position; there is a gradual enlargement of the abdomen, and as the fluid increases there is increased

difficulty in breathing. In the chronic stages of the disease, the progress is slow; but the belly becomes more and more baggy; and in some instances the hair of the tail comes away easily or drops out, showing that the skin and capillary glands of that part of the body are affected.

The presence of water, when it has collected in any considerable quantity, may be detected by placing the ear to the abdomen and having some one slap the horse on the opposite side with the open palm.

In mares, this enlargement of the belly is sometimes mistaken for a pregnant condition; but it may be readily distinguished by a fluctuating feeling which follows a pressure upon the parts with the fingers, a sort of fluid motion, as of water forcibly displaced.

What to do.—If it is known to proceed from local injuries, or from diseases of the vital organs, it is scarcely necessary to adopt any course of treatment, unless, indeed, the primary disease can itself be removed; but when it depends upon inflammation of the peritoneum, or when it results from bad or deficient food and unwholesome surroundings, place the horse in a good, dry and well-ventilated stall, feed him generously, and give him the following tonic ball, night and morning:

No. 49. 1 Oz. powdered digitalis,
½ Oz. sulphate of iron.

Mix with mucilage and a spoonful of linseed meal to form a ball of sufficient firmness for handling.

It is important that the kidneys should be kept active, and the following diuretic must be used for that purpose:

No. 50. 2 Pounds soap,
2 Pounds nitrate of potash,
3 Pounds rosin,
2 Pounds Venice turpentine,
¾ Pint oil of turpentine,

Melt the soap and rosin slowly together, and stir in the other ingredients while the former mixture is cooling. Make it into 2-ounce balls with linseed meal, and give one at a time as often as necessary to keep up a somewhat copious action of the kidneys.

If at any time the water accumulates in a great quantity, draw it off by means of a fine trocar, plunged into the most dependent or lowest part of the distended abdomen.

CHAPTER V.

DISEASES OF THE THROAT, CHEST AND LUNGS.

I. CHEST-FOUNDER. —— II. BRONCHITIS. —— III. PNEUMONIA, OR INFLAMMATION OF THE LUNGS.——IV. CONSUMPTION. ——V. PLEURISY.——VI. COLDS.——VII. ENLARGED GLANDS. VIII. SWELLED THROAT, OR LARYNGITIS. —— IX. CHRONIC COUGH. —— X. MALIGNANT EPIDEMIC. —— XI. DIFFICULTY OF BREATHING. —— XII. BROKEN WIND, — BELLOWS, — HEAVES. —— XIII. INFLUENZA. —— XIV. SPASMODIC ACTION OF THE GLOTTIS AND EPIGLOTTIS.—XV. CROUP.——XVI. BLEEDING FROM THE NOSE.——XVII. STRANGLES.

I. Chest-Founder.

This when it is not soreness of the muscles from hard work, is rheumatism in its acute form. Sometimes it is caused by lesion, or straining of the muscles or the tendons connected with them.

Causes.—It may be brought on by suddenly allowing the horse to become chilled after heating, giving large drafts of cold water when warm, or driving him into cold water up to his belly when heated.

How to know it.—The horse is dull; his coat may be staring; he is stiff, and moves unwillingly. Sometimes the soreness extends to the limbs; usually does from sympathy. There is fever in the parts affected and accelerated pulse, the latter from 70 to 80 beats in a minute. Also, sometimes profuse sweating and heaving at the flanks, but the legs will remain warm. The parts affected may be more or less swollen, but always tender to the touch.

What to do.—Clothe the horse warmly, and put him where he may be kept so. If the animal is fat, and full of blood; if there is evident determination of blood, bleed moderately, say a pint from the neck vein.

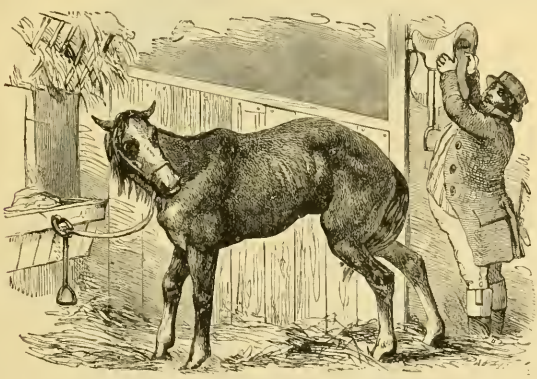
We never, however, advise bleeding, except by a veterinary surgeon or physician who knows his business. Wash the throat in warm salt and water. Relieve the bowels as soon as possible by an injection of soap suds, if the rectum be impacted. Give as a laxative 4 drachms Barbadoes aloes. Pulverize and mix into a ball with molasses and linseed meal to form a mass or give the following:

No. 51. ½ Oz. ground ginger,
1 Drachm tartar emetic,
1 Pint salt and water.

Mix and give as warm as the horse can swallow it. As a rule the horse being thoroughly physicked will get better; if not, apply a mild blister.

No. 52. 1 Oz. powdered cantharides,
8 Oz. lard oil.

Heat to blood heat and mix thoroughly. Shave the hair from the breast, wash with warm vinegar and apply the mixture rubbing it well in. When the blisters rise dress with a plaster of mutton tallow.



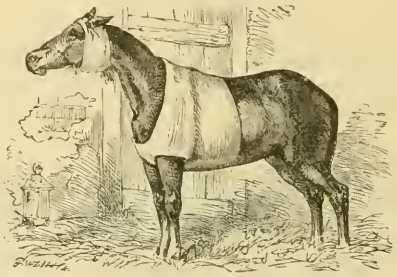
A FIT SUBJECT FOR FOUNDER OR BRONCHITIS.

II. Bronchitis.

Causes.—Exposure of a heated and steaming horse to chill, or over exertion, and leaving the horse in the stable, when the system is quite relaxed. Riding to town and leaving a horse in the cold and wind while the owner is making himself comfortable. There is first a cold, enlarged glands and swelled throat. The inflammation extends down from the

larynx through the trachea into the bronchial tubes and air passages of the lungs, and ends sometimes in confirmed and incurable bronchitis.

How to know it.—In the acute stage there is difficulty and rapidity of breathing, from the filling of the membranes with blood and the consequent diminishing of the size of the tube. After a time mucus is formed and increases the difficulty of breathing and causes a cough. The pulse will be 60 or 70 beats per minute; the cough will become hard and dry, and the sound in the throat will be rattling, and after the secretion of mucus a gurgling sound will be given similar to that made in blowing soap bubbles. In extreme cases the breathing becomes extremely laborious, the cough is constant and distressing, the legs are extended, and at length the animal dies of suffocation.



A HORSE DRESSED FOR BRONCHITIS.

What to do.—The first step is to find the extent of the inflammation. *Never bleed.* Clothe the animal warmly and give an injection of warm water to relieve the bowels. Avoid all strong purgatives. In fact, give none unless the bowels are decidedly bound up. Let the food be soft and laxative, green grass in Summer, or mashes and gruels in Winter. For the throat, scalded soft hay, fastened by means of the eight tailed bandages, will be good. Wash the neck and chest with a weak decoction of tobacco as hot as it can be borne. When dry, shave the hair from the chest and apply a blister of better strength than that advised for chest founder. The following will be good:

No. 53.
1 Ounce powdered cantharides.
1 Ounce powdered resin,
4 Ounces lard oil.

Melt the resin and lard together, with just sufficient heat to melt the

resin. Add the cantharides and stir until it sets together. Apply to the chest and throat if the case is desperate. If only irritation is desired the following will be good:

No. 54. 4 Ounces lard oil,
1 Ounce turpentine,
6 Drachms powdered cantharides.

Shave the hair and apply by rubbing in. .

For the body prepare a strong cloth as shown on preceding page. Get two pieces of flannel three yards long and the full width of the fabric, also four pieces half a yard long and a foot wide. Saturate one of the pieces with cold water, fold, and apply near the top of the back, equally on each side. Two of the smaller pieces are to be saturated with water and laid along the sides of the chest, fasten the jacket at the back so as to hold all snug. When the flannels are warm remove them and replace immediately with others. So continue for two or three hours as the case may be, and then allow them to remain until the animal is pretty well recovered.

In very aggravated cases of congestion give every half hour until the pulse regains its tone, and then at longer intervals, reduced at last to once a day, the following:

No. 55. 1 Ounce sulphuric ether,
1 Ounce laudanum,
1 Pint water.

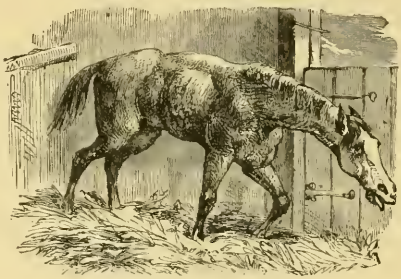
At the third dose discontinue if the effect required is not produced and give the following:

No. 56. ½ Ounce of aconite,
½ Drachm of extract of belladonna.

Rub down the belladonna with an ounce of water. Mix. Give this every hour until the pulse is better, then withdraw the aconite and half the laudanum, and add half a drachm of belladonna to the drink first recommended. (No. 55.) Let the food be thick gruel of oatmeal, boiled potatoes, and oatmeal and bran mashes. Give no dry, and especially no dirty food. When the animal begins to recover so as to eat whole grain, grass and hay, let them be especially freed from dust, and let them be given moistened, until the horse be perfectly recovered.

If the disease is to terminate fatally, the pulse will grow quick and tremulous. In drawing the breath the body will quiver, showing increasing difficulty and pain. The membrane of the nose becomes of a bluish tint with frothy blood and purulent matter about the nostrils. The

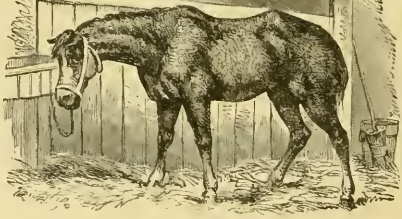
respiration, will become more and more difficult, and the cough most distressing, and continuing until a quantity of fluid matter is ejected from the nostrils, only again and again to be resumed. Thus the animal suffers and dies, or else slowly recovers, remaining through life with the cough of incurable bronchitis.



A COUGH OF INCURABLE BRONCHITIS.

III. Pneumonia, or Inflammation of the Lungs.

This may follow acute congestion of the lungs, this being really its first stage, though often not noticed, by the ordinary observer, as such. But congestion may occur in its sudden and fatal form from overtaxing a fat horse, or one otherwise out of condition. Suppose from hard driving or hard riding he hangs heavily on the bit; droops and staggers;



A CASE OF CONGESTION.

if not pulled up he may fall: or getting to the stable he stands with dilated nostrils, extended head, quick, convulsive or labored breathing, eyes staring and bloodshot, his nasal membrane deep red or blue, and

pulse rapid and weak; if in putting the ear to the chest there is a loud respiratory murmur with crepitation (a peculiar slight cracking sound); if the heart, as felt behind the left elbow, is beating tumultuously; if the limbs are cold, with perspiration breaking out on different parts of the body, there is no time to lose. In extreme cases bleed at once from the neck vein. The blood will be turbid, dark, almost jelly-like in very bad cases.

Remove everything from the animal that may impede breathing, and allow him plenty of fresh air. Give an active stimulant, the easiest to be had; whisky, four or five ounces, or a tumbler full in a half pint of water. If this cannot be had give an ounce of ground ginger in a pint of water, or a half ounce of oil of turpentine in half a tumbler of water. Give also warm water injections to relieve the bowels, and also active hand rubbing of the legs to promote circulation to the surface, while the body is enveloped in blankets wrung out of hot water, and covered with dry ones. If the patient does not soon recover under this treatment the case will be one of pneumonia.

How to know it.—If the disease does not succeed to the symptoms we have just described, those of acute congestion, there will be a chill with shivering, and generally a dry cough, but deep as though from the chest. There will be a hot skin, indicating fever, quick-labored breathing, a full but oppressed pulse. The membranes of the eyes, nose and mouth will be red, and as the disease advances a yellowish or whitish matter will come from the nostrils. The horse will always stand with the legs wide apart; so will the ox in bad cases, and the latter will moan with each expiration of the breath. Generally the ox will lie down. There will be crepitation of the lungs about the seat of the disease, and a more than normal murmur upon applying the ear. By percussion, striking the affected parts, there will be flinching and even groaning, but except at the seat of the disease the chest will retain its healthy sound, while the diseased parts will sound dull and solid. Thus, by the ear, and sounding by the hand, the progress of the solidification of the lungs may be followed from day to day.

THE POSITION ASSUMED BY THE HORSE DURING AN ATTACK OF PNEUMONIA.

What to do.—Under the advice of a veterinary surgeon or physician, blood may be drawn. If none such are near, if the animal be young and

plethoric, blood may be drawn in the earlier stages. Place the animal in a loose box stall, with plenty of ventilation to the stable. If the bowels are costive, loosen them by injections of warm water. Bandage the limbs to keep them warm, and give the body such clothing as the necessities of the case seem to require. Let the food be simple, laxative and cooling. Bran mashes, boiled carrots, linseed meal, soft sweet hay. Do not check diarrhœa or profuse staling; it is an effort of nature to relieve the system. If there is fever, give plenty of water. If there is swift pulse and oppression of the lungs, give 20 to 30 drops of tincture of aconite in half a pint of water, or 1 to 2 drachms of tincture of veratrum in water every two hours. If under this treatment the system becomes depressed, and it must be watched, discontinue. If the pulse falls—if there is trembling sweats, and a peculiar anxious expression in the eyes, discontinue. If there is great exhaustion, give moderate doses of whisky, but discontinue it unless good effects are seen. If there is much weakness, give two drachms each of camphor and of carbonate of ammonia, made into a ball with molasses and linseed meal, twice a day. In the case of considerable congestion, strong mustard poultices will be indicated, to be applied to the chest; or in extreme cases, blister.

In the case of cattle, the same general treatment should be followed. Double the quantity of aconite and ammonia should be given. As a rule, cattle require more than the horse; and in giving medicine to cattle it must trickle down the throat, in order that it may not pass into the first stomach.

In this disease symptoms must be watched. Good nursing is of especial value, and as the animal begins to recover, give soft and easily digestible food, and assist the system if necessary with wine, ale or whisky in very light doses.

IV. Consumption.

This hereditary affection is much more common in the West than is generally supposed. More common in cattle and even in sheep and swine than in horses. In horses it is comparatively rare. The disease may be communicated to healthy animals by inoculation, and by eating the raw flesh of diseased animals, and it may also be superinduced in animals predisposed to the disease by local inflammation; so also the germs may be received in milk, when the disease has invaded the mammary glands of the cow. Deep milking cattle with narrow horns, thin necks and narrow chests are especially predisposed to the disease. Tubercles may be developed in any part of the body, even, in rare cases, the bones and muscles; the lungs, the spleen, the liver, the pancreas, the ovaries and the kidneys are the usual seats of the disease.

Causes.—Badly constructed and illy ventilated stables; moving from a warm to a cold climate; exposure to cold and wet; or any thing which tends to lower the health in a predisposed animal will bring on the disease.

How to Know it.—The disease may be acute, carrying off the animal, sometimes, in a few weeks. It is generally chronic. The attack is insidious, tubercles often being formed before danger is suspected. There is a general dullness and loss of spirit, tenderness of the withers, back, loins, and of the walls of the chest. In cattle the nose will often be dry, showing fever; the ears and horns will be hot; the skin loses its elasticity and pliant quality. The heat of the body may go up to 102 degrees; the pulse is weak but accelerated, and there is a slight, dry, but not frequent cough; the lymphatic glands about the throat may be enlarged and there may be swelling of the joints. If the chest is sounded there may be heard a murmuring sound hoarser than natural, if it be listened for just over the lower end of the wind pipe or in the chest. As the disease advances, the eyes become more and more sunken, the skin becomes more and more hide bound, the hair is dry and erect. If the bowels are involved there will be more or less scouring, and if the lungs are principally affected there will be swelling and lameness, labored breathing, exhaustion and profuse perspiration occurring upon the slightest exercise. There will be temporary windy distention of the stomach after feeding, and the appetite fails. The cough increases with rattling, the discharge at first light, increases. There is crepitation (a rattling or snapping sound) of the lungs, with a whirring or gurgling of the chest, and percussion gives a dull sound, with wincing when the parts covering them are handled. So if tubercles are formed in the liver, pancreas, or kidneys it will show the involvement of these parts. Recoveries are rare. Occasionally calcification of the tubercles occurs in animals naturally of a strong constitution, but the disease usually ends in death.

What to do.—A cure is scarcely ever accomplished. The symptoms may be mitigated. The animal must have dry, pure air, plenty of sunshine, Summer and Winter, and be protected from sudden changes, and must be kept warm. The food should be light and digestible, good grass in Summer and ground food with linseed meal and roots in Winter. In the early stages of the disease four to five drachms of gentian may be given daily in the food, at two or three doses, alternated with two drachms of sulphate of iron as a tonic. As an expectorant, and diaphoretic, give occasionally three to four ounces flowers of sulphur every other day, or once in three days, or to act on the skin and as a diuretic, the following:

No. 57. 2 Ounces of flowers of sulphur.
2 To 3 three drachms powdered resin.

Mix and give a dose daily until the effect is produced; and afterwards as needed. As an antiseptic (to counteract putresence) the fumes of burning sulphur would be indicated.

How to Prevent.—From what we have written the owner will understand the difficulty attending the treatment of this disease, and also its dangerous character in the case of cattle. The flesh and milk it is better not to use at all, although danger can be destroyed by the most thorough cooking. Using consumptive animals as breeders, or selling the milk of consumptive animals should not be thought of. Drainage, good pasturage, a warm, sunny location for the stables and yards, care against all chronic and debilitating diseases, good, liberal feeding, especially when animals are giving milk, the prompt removal of all consumptive animals from pastures and buildings, and the thorough fumigation of the latter is recommended.

V. Pleurisy.

This is an inflammation of the membrane lining of the chest and covering of the lungs. It is common to all domestic animals, in exposed situations and those liable to rheumatism. The pleura is one of the serous membranes, those lining close cavities, as the chest, abdomen and joints. In health they are insensible to us, but under the effects of inflammation the most sensitive and painful possible. Since every inspiration and expiration of the breath moves these membranous linings upon each other, we can at once see the extreme anguish it must occasion. If relief is not soon obtained the disease quickly ends in death.

How to know Pleurisy.—There will be some alternations of shivering followed by heat of the skin, sometimes extending to the limbs. There will be localized sweating and congestion of the muscles. If confined to one side the foot of that side will be extended. The animal will look at the flank, lie down, rise again, and there will be general uneasiness indicative of pain. The pulse will be quick and hard, seeming to strike the finger under the compression. There will be inclination to cough, but which the animal will fear to exercise. The cough is not always present, but when so, is always suppressed, short and hacking. The breathing will be hurried, but apparently confined to the abdominal muscles, the inspiration short and checked, but the expiration slow and prolonged. In pneumonia and bronchitis there is often intense redness of the nose, in pleurisy less. There is no nasal discharge and the heat of the breath is not so great as in pneumonia. After effusion of serum (fluid matter or water) into the cavity of the chest ensues, which may be in 24 or 36 hours, the pulse becomes soft, and the animal seems better. If

the effusion is re-absorbed the animal will recover. If not, the pulse loses its full tone, and again becomes hard and quick. The breathing is again difficult and attended with lifting of the flank and loin. The nose and head is extended, the nostrils are dilated, with signs of suffocation. The pulse at length becomes weak, thrilling at each beat until at length the animal wavers, staggers, falls and dies.

An attack of pleurisy is often taken by those unacquainted with the disease for spasmodic colic. This error, if made, will probably be fatal to the animal affected. In colic the pulse is natural at the commencement, and the paroxysms of pain are of short duration. In pleurisy the artery is thin, the pulsations seem to strike the fingers, but the stroke is short. The pain is continuous, the body hot, but the feet generally cold.

What to do.—The same general care as in bronchitis and inflammation of the lungs is to be observed. If there is a chill, wrap the horse completely in blankets wrung out of hot water, and cover with dry ones. When removed,do so a little at a time, rubbing dry, and re-clothe warmly. If taken in its earliest stage, give:

No. 58. ½ Ounce laudanum,
½ Pint linseed oil.

This will often prove effective; if not, repeat the dose in a few hours. For an ox, give double this dose. If the symptoms increase, apply a strong mustard poultice to the side of the chest, or a blister. No. 53 may be applied to the chest. The bowels should be kept moderately open. If effusion of water takes place, give 6 drachms of acetate of potassa once or twice a day in a pail of water. The following will be found excellent in place of the last named remedy, if there is weakness and a rapid pulse (70 to 80), and scanty urine:

No. 59. ½ Ounce tincture of chloride of iron,
¾ pail water.
Give as a drink twice daily.

The effusion of water not yielding, the chest may be tapped with a trochar. Divide the skin with a lancet, between the eighth and ninth rib and near the lower end. Be careful the air does not enter. Draw off only a part of the water if it produces a shock. In this, one should have the advice of a veterinarian. Repeat in 24 to 48 hours. The animal should be kept up with sulphate of iron, two drachms, twice a day, in water, with stimulants and easily digestible and nutritious food.

It is absolutely necessary, after effusion of water has taken place, that the urine should be passed freely to assist absorption. To this end the following will be indicated:

No. 60.

1 Drachm iodide of potassium,
1 Drachm carbonate of ammonia,
½ Ounce powdered gentian.

Give twice a day as a drench in a quart of water, or as a ball mixed with linseed meal and molasses.

VI. Colds.

Colds in horses, as in the human family, are usually the result of improper care or undue exposure. Taking a horse from a hot, illy ventilated stable, and allowing him after driving to become cold, is one prolific cause of colds. There are so many means of causing this disability that it would be impossible to enumerate them. If the attack is light, all that will be necessary will be to clothe the animal warmly and relax the bowels with a warm mash, and give rest for a few days.

A HORSE'S HEAD WITH COLD.

Sometimes, however, the attack is prolonged and severe. The appetite ceases, the coat roughens, parts of the body are hot and others cold, the membrane of the nose at first dry and pale, with the facial sinuses clogged, at length terminates in a discharge more or less great, but without improving the health of the horse.

What to do.—Keep the animal warmly clothed, in ample box stall, with plenty of bedding. If the cold does not give way in a few days after the first attack, and the symptoms are as we have indicated, or if the membranes of the nose are dry, make a sack of coarse gunny cloth, large enough so it may fit the nose properly, but enlarging to the bottom, and two feet or more long, with a slit covered with a flap in the side, half way down. Put into the bag half a peck or more of coarse pine sawdust with which half an ounce of spirits of turpentine has been thoroughly mixed. Place the bag on the nose as shown in the cut on next page.

Turn two gallons of hot water in the slit, and every twenty minutes repeat, allowing the bag to remain on an hour each time, use this six times a day until the discharge begins. When water runs freely from the nose, three times daily will be enough. Let the food be good scalded oats or other like food, with mashes if the bowels are constipated.

An animal with this kind of a cold should not be put to steady work until entirely recovered. The result of protracted cold is great weakness, and work before recovery often leads to disease of the air passages and lungs. If there is much fever give the following:

No. 61. 2 Drachms spirits of ammonia,
2 Drachms ether.

Mix and give in a little gruel, (say 1-2 pint,) twice a day. If the throat is involved poultice it with linseed meal in which a little mustard has been mixed. When the symptoms give way and improvement begins, or if the appetite is not good prepare the following:

No. 62. 2 Ounces powdered gentian,
2 Ounces carbonate of ammonia.

Form this into a mass, with linseed oil and molasses, divided into eight parts and give one twice each day. If the cold becomes chronic it ends in catarrh. When there are catarrhal symptoms and sore throat give the following:

No. 63. 1 Drachm extract of belladonna,
2 Drachms ipecac,
2 Drachms powdered camphor,
4 Drachms nitre.

Mix into a ball with linseed oil, and give one every three or four hours. In inveterate or chronic cold there is discharge, and swelling of the lymphatic gland. We have already shown how glanders may be known.

1

HEAD WITH LYMPHATIC GLAND OF THE THROAT SWOLLEN.

1—The enlarged lymphatic within the jaw.

We give a cut showing the enlargement of the lymphatic gland in chronic cold. In case the horse gets cold it is better that he be examined by a competent veterinary surgeon, (not by a quack,) in order to be sure the disease is not glanders.

NOSE BAG FOR STEAMING HORSE WITH COLD.

VII. Enlarged Glands—Goitre.

There are various glands in the throat that are subject to enlargement from disease, and which remain permanent after the disease is passed. This result is generally more unsightly as a blemish than as a real disability. Goitre, however, is a disease peculiar to some limestone regions, producing in animals as in man a swelling of the thyroid gland. In some portions of the East it is quite prevalent, producing extensive enlarge-

ments in lambs. It also attacks cattle and swine. In solid-hoofed animals, as in the horse, there may be a swelling on either side; in others it is in the center just below the roots of the jaws. For all enlargements of the glands, tincture of iodine will disperse the swelling if it may be possible. In bronchocele or goitre, rainwater only should be given to drink; iodine in doses of ten grains daily may be given on an empty stomach, and the swelling may be painted with the tincture. This to be persisted in for months. Another remedy that has been successful, is the following:

No. 64. ½ Drachm iodide of potassium,
1 Drachm liquor potassæ,
½ Pint rainwater.

Mix, and give as a dose night and morning, using the tincture of iodine on the goitre.

VIII. Swelled Throat, or Laryngitis.

Causes.—Foul stables or any cause producing colds, catarrhs, etc. It is sometimes divided professionally into laryngitis and pharyngitis, but practically they are one—inflammation of the air and food passages of the neck, generally accompanied with cough, difficulty in swallowing and fever.

How to Know it.—The animal is dull. The head is carried in a peculiar manner, as though the neck were stiff. There is a short, frequent cough, the breath is hurried, the pulse full and throbbing, and the membranes of the nasal passages are high colored, almost scarlet. There will be a hoarse sound, approaching to a grunt, at each breath taken, if the ears are held against the animal's wind-pipe. Externally there is more or less enlargement over the region of the larynx, the enlargement of the windpipe next the throat. Handling the throat seems to produce extreme pain.

What to do.—Reduce the pulse at once by doses of tincture of aconite in a wine glass full of water, repeated every half hour. Place the steaming-bag on the nose, as recommended for colds. Keep it employed almost constantly, for there may be danger of strangulation. If the steaming seems to distress the animal, omit it, or use it only occasionally, and soak soft hay in boiling water and apply to the throat as hot as can be borne. Bandage and fasten with the eight-tailed bandage previously described. Or, ferment the throat with cloths wrung out of hot mustard water. If there is difficulty in swallowing, put a teaspoonful of the following well back on the tongue several times a day:

No. 65. 1 Ounce powdered guaiacum,
4 Ounces powdered chlorate of potash,
½ Pint of molasses.

Do not in administering anything, force the jaws wide apart. Act as gently as possible. If the animal is feverish and the throat hot and dry, give three times a day, in a pint of cold linseed tea, the following:

No. 66. 1 Drachm powdered ipecac,
1 Ounce solution of acetate of ammonia

In case the disease becomes chronic, the following excitant to the throat will be indicated:

No. 67. 1 Part oil of turpentine,
1 Part solution of ammonia,
1 Part olive oil.

Mix, shake the bottle before using, and rub well in on the throat every day. If this does not relieve, apply the following blister:

No. 68. 1 Drachm croton oil,
1 Drachm sulphuric ether,
10 Drachms alcohol.

Mix, and apply by rubbing with considerable friction.

A HORSE WITH THE THROAT BLISTERED.

A SETON IN THE THROAT OF A HORSE.

When the symptoms become more favorable, by the membranes of the nose becoming pale or more natural in color; by the cough becoming more free, or louder, easier and with less violent breathing, and by the appearance of a white and thick discharge from the nostrils, put a seton in the throat, (see cut,) and allow nothing but moist and succulent food. Move the seton daily until healthy pus (matter) is formed. Then cut one of the knots and withdraw it, and as the horse recovers allow drier food—hay and grain—but that entirely free from dust. See that no stones or grit are in the oats, and soak for five or six hours before feeding. In this, as in diseases where the throat is more or less sore, the horse may quid his food. This is not a symptom of laryngitis as is some-

times supposed, but known to all diseases where there is obstruction in swallowing.

IX. Chronic Cough.

A HORSE QUIDDING.

There are many cases of long standing or chronic cough. Cough is an attendant upon so many disorders of the air passages, from the most trivial difficulty in teething to glanders, that a cough should not be overlooked in the diagnose of diseases. And so many diseases leave the patient with chronic cough, that its symptomatic stages should be carefully observed.

Coughing tends generally to a thickening of the membranes. When the membrane covering the larynx becomes thickened, and consequently morbidly sensitive, the cough becomes fixed or what is termed chronic.

The sense of smell in the nose is peculiarly acute, and the membranes of the nose and throat, as a matter of course, are fully as sensitive. We have said, "the limbs and feet are half the horse: the lungs the test of his endurance." Yet nine in ten of the stables in which horses are kept are offensive to man and irritate the air passages when first entered. Yet the sense of smell in man is not very acute, except in a few directions. A stable therefore, offensive to man is not a fit place for horses to be kept, where the lungs constitute one of the principal excellencies of the animal.

THE ACT OF COUGHING.

The cough which accompanies the several diseases of which this volume treats, will be described in the treatment of the diseases themselves. In this article chronic cough will be treated, the cough that is always present in eating, drinking and inhaling a cold draught of air, or from

any cause of excitement, requiring long and careful nursing for their cure. The chronic cough, resulting from colds, is hard and metallic. For this, the following will be good, to be rubbed on the throat and around the windpipe, once in ten days:

No. 69. 15 Drops croton oil,
1 Ounce glycerine,

Give twice a day, for a week, the following:

No. 70. 40 Drops diluted prussic acid,
1 Ounce niter,
1 Ounce bicarbonate of soda,
1 Quart water.

If this does not give relief, the following, valuable for irritable chronic cough, the result of influenza or sore throat, may be used:

No. 71. 1 Ounce Fowler's solution of arsenic,
1 Ounce chlorate of potash,
1 Drachm belladona.

Give once a day in water or gruel and note results, ceasing after a week or ten days, if no improvement ensues. For cough and sore throat, when first discovered, take:

No. 72. 1 Drachm powdered camphor,
1 Drachm extract belladona,
2 Ounces sweet spirits niter.

Give in a pint of cold gruel three times a day. Tar-water is well known to be valuable in obstinate coughs. Give every morning as a drink, the following:

No. 73. 1 Drachm powdered squills,
½ Pint tar-water,
½ Pint lime-water.

If the cough is violent, use as a sedative, the following:

No. 74. 1 Drachm dilute prussic acid,
2 Drachms powdered opium,
4 Drachms niter.

Mix in a pint of linseed tea and give from five to six table-spoonfuls three times a day.

Expectorants, calculated to loosen the cough and restore the secretions to their natural conditions, do not act so kindly as could be wished on farm animals. For a long standing cough, try the following:

No. 75.
1 Drachm aloes,
1 Drachm squills,
2 Drachms gum ammoniacum.

Mix into a ball with meal and give once a day in the morning. If the cough is irritable and easily excited, and the bowels natural, omit the aloes and substitute for it one drachm of opium.

For a cold settled in the chest, with cough, give every morning the following:

No. 76.
1 Drachm ipecac,
1 Drachm liquorice powder,
½ Ounce nitrate of ammonia.

Add tar, the size of a hazel-nut and mix with molasses to form a ball. All coughs resulting from indigestion or worms, and some of those resulting from irritation of the passages of the throat, are often cured by turning the horse out in Summer where he may have free range on the prairie, where resin weed grows plentifully. A long standing cough, however, requires time, and the operator must use judgment in administering medicine. If he be a veterinary surgeon he will make up his mind from various symptoms. The farmer should endeavor carefully to do the same.

X. Malignant Epidemic.

Under this head the older veterinarians were accustomed to term several diseases that sweeping over a country became unusually prevalent or fatal. Thus Dr. Layard and Ohmer long ago wrote of malignant epidemic, probably a severe form of catarrhal fever, or epidemic catarrh, and also known as influenza distemper, malignant epidemic, murrain, pest, etc.

Youatt describes a malignant disease occurring in 1714 in England, imported from the continent and destroying in the course of a few months 70,000 horses and cattle. Professor Bruquon, of Turin, says of this disease, that it commenced with loss of appetite, staring coat, a wild and wandering look, and a staggering from the very commencement. The horse would continually lie down and get up again, as if tormented by colic; and he gazed alternately at both flanks. In moments of comparative ease there were universal twitchings of the skin and spasms of the limbs. The temperature of the ears and feet was variable. If there happened to be about the animal any old wound or scar from setoning or firing, it opened afresh and discharged a quantity of thick and black blood. Very shortly afterward the flanks, which were quiet before, began to heave, the nostrils were dilated, the head extended for breath. The

horse had, by this time become so weak that, if he lay, or fell down, he could rise no more; or, if he was up, he would stand trembling, staggering, and threatening to fall every moment. The mouth was dry, the tongue white and the breath fetid; a discharge of yellow or fetid matter proceeded from the nose and fetid matter from the anus. The duration of the disease did not exceed twelve or twenty-four hours; or if the animal lingered on swellings of the head and throat and sheath and scrotum followed, and he died exhausted, or in convulsions.

Black spots — extravasation — were found in cellular membrane, in the tissue of all the membranes, and on the coats of the stomach. The mesenteric and lymphatic glands were engorged, black and gangrenous. The membrane of the nose and pharynx were highly injected, the lungs were filled with black and frothy blood, or with black and livid spots. The brain and its meninges were unaltered.

XI. Difficulty of Breathing.

From whatever source this may arise, whether from some disorganization, or change in the lungs, or obstruction in the air passages; whatever the obstruction be, it must first be traced to its cause before good can be done. This is sometimes not easy to do; the owner must act with judgment. Thick wind often follows pneumonia, and is caused by closing or obliteration (hepatization) of a portion of the lungs. If it does not pass away after the disease which preceded it is entirely cured, it may be mitigated by feeding the animal on sound oats, entirely freed from dust, giving but little hay, that moistened, and avoiding any food that is dusty. Mashes and carrots in Winter sufficient to keep the bowels properly open, and turning on prairie pasture in Summer will be indicated.

Roaring has rendered nearly useless many valuable horses in England; in the United States horses are not subject to it. It is said to be produced by obstruction in some part of the respiratory canal, most often in the larynx and next in the trachea. Thus chronic cough sometimes terminates in roaring. In this country heaves is the most usual termination.

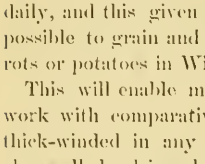
XII. Broken Wind; Bellows; Heaves.

Causes.—Broken wind is the result both of disease of the lungs and violent exertions. Feeding on dusty hay and grain are prolific sources of the disease. Where no clover hay is used, the disease is rare. It is mainly confined to horses that have arrived at maturity. A horse fed for days and weeks on dusty hay, and then driven hard, will exhibit heaves, unless his lungs and digestion are extraordinary. This disease is usually known in the South under the name of bellows, and in the North as heaves, either of them expressive of the disease.

How to know it.—Broken wind is nearly allied to asthma in man, but is more continuous in its action and less liable to occur in paroxysms. At each breath there will be a two-fold motion of the flank, caused by a falling in of the abdominal walls, causing the flank to lift, then after a perceptible interval a rising of the back part of the belly assists in freeing the lungs of air. There is a short, dry cough, sometimes almost inaudible, followed by whirring. When the horse is moved suddenly, or driven hard, when a draught of cold water is given, or the animal is suddenly brought into the cold air, the spells will occur. Indigestion is almost always present, and as a consequence of flatulency of the bowels. The appetite is ravenous and unnatural; eating the litter given for bedding, is one of the many exhibitions of it.

What to do.—There is no permanent cure for this disability. The symptoms and distress may be alleviated by giving only sound grain and bright, hard stalked hay, free from dust. Prairie hay with plenty of resin leaf in it is the best; next, clean cured corn-stalks. But little water should be allowed at a time, and not more than 6 to 8 pounds of hay, daily, and this given at night, the provender being confined as much as possible to grain and grass in Summer, and grain, bran-mashes and carrots or potatoes in Winter.

This will enable many broken-winded horses to do a fair amount of work with comparative comfort. In any event, a horse inclined to be thick-winded in any degree, should never be tightly checked up, nor above all, be driven by pulling in the head, causing undue bearing either of the curb or snaffle on the jaw.



BIT BEARING UPON JAW.

The animal should be allowed to hold its head in the easiest position, since its work must be necessarily slow. One of the most usual palliative means of the animal appearing for a time sound, is to give 10 to 15 grains of arsenic a day for a week or ten days. A better preparation to give relief—afterwards, the animal to be turned out on clean, short grass, is the following:

No. 77. 1 Ounce Fowler's solution of arsenic,
1 Drachm extract of belladonna,
½ Drachm tincture of ginger.

Give once a day, in the morning, in one pint of water, and continue for four to eight weeks, as circumstances may dictate.

XIII. Influenza.

This epizootic, which first and last has been prevalent in nearly all countries where the horse is used, is, as to its origin, but little understood. Its symptoms, however, are well known, but these may be complicated by inflammatory symptoms of all the air passages; also by rheumatic swellings, paralysis, delirium and inflammation of the eyes.

How to know it.—The attack may be sudden. There will be stupor and weakness, the head will be held low, the eyes dull and half closed, the gait will be weak, with cracking of the joints sometimes. There will be no appetite, and fever; the mouth hot and clammy, the bowels costive, with scanty urine; the pulse quick and weak, but sometimes hard; the membrane of the nose may be pink, or a deep leaden hue; the cough will be deep and harsh; the coat rough and staring; the skin tender and sometimes trembling, and the ears and limbs alternately hot and cold. Upon applying the ear to the lungs crepitation will be heard, or sometimes a harsh blowing sound. As the disease progresses, and the nose discharges a white, yellowish or greenish water, the animal may get better; but when the lungs are seriously involved, the symptoms will increase. As a rule there is constipation, although purging is sometimes present.

CONFIRMED INFLUENZA.

What to do.—Place the animal in a well littered stall, free from drafts of air. Do not depend upon strong physic. The cure must be effected by watching the symptoms and combating them. If there is costiveness keep the bowels open by injections of two wine glasses full of linseed oil. Relief must be had by means of stimulants and tonics. Good nursing must be constant, with clothing enough to keep the animal warm. A good tonic and stimulant is:

No. 78
2 Oz of gentian,
2 Oz. carbonate ammonia.

Form in eight doses and give one night and morning. If the cough is distressing prepare the following:

No. 79.
½ Oz. extract belladonna,
2 Drachms powdered opium,
3 Drachms camphor,
2 Oz. liquorice,
½ Pint molasses.

Mix thoroughly and spread a table-spoonful on the tongue twice a day. If, with the cough, there is sore throat and catarrh, prepare the following:

No. 80.
20 Grains iodine,
1 Drachm iodide of potassium,
2 Ounces sweet spirits of niter,
1 Pint water gruel.

Give this as a dose twice a day. If the animal should begin to improve it will be about the fifth day.

Sometimes recovery is complicated by various disabilities. If there is dropsy or swelling of the legs or sheath, prepare the following:

No. 81.
1 Oz. iodide of potassium,
1 Oz. carbonate of ammonia,
1 Oz. powdered gentian.

Form into eight balls and give one morning and evening.

If a spasmodic cough follows the attack the following will be indicated:

No. 82.
1 Drachm extract of belladonna,
1 Drachm chloroform,
10 Drachms alcohol.

Mix in a pint of gruel and let it trickle slowly down the throat, in order to produce a full local effect.

As recovery ensues, the food should be nourishing and easily digested. The animal should be induced to take food during the disease, especially in the form of nourishing gruel. When the pulse changes, and especially when it loses its wiry character; when the discharge from the nose becomes steady and copious, a pint of ale occasionally is a good stimulant. In any event, good, easily digested food should be given, and the animal must be nursed until entirely recovered.

XIV. Spasmodic Action of the Glottis and Epiglottis.

This may be occasioned rarely by food sticking in the æsophagus. It is sometimes attendant upon cutting the teeth. In the latter case the

gums should be cut. Spasm of the glottis passes away by a peculiar crowing inspiration. It is so rare in horses that it will only be necessary to say that its cause must be looked to in the general health of the animal.

This disease is generally confined to young animals, and is more rare in colts than in calves or lambs.

Causes.—Being confined to damp, low lying ground, or in cold, damp, or much exposed localities.

How to know it.—The first symptoms are like those of sore throat. There will be a dry whirring breathing and a hard metallic cough. Sometimes it will be heard only when spasm of the larynx comes on. As the disease progresses the fever increases, the temperature of the body running to 107 degrees, and the pulse from ninety to over one hundred. White films or pellicles (albuminous false membranes) form in the throat, which come away from time to time, or if not, the animal dies of suffocation.

What to do.—Place the animal where it may have free air but no drafts, and where the temperature may be kept comfortable. Allow sufficient clothing. Give as a laxative twelve ounces Glauber salts dissolved in a quart of warm water.

As an antispasmodic give two or three drachm doses of laudanum every hour in a decoction of marsh mallow. In the early stage of the disease warm fomentations persistently applied may scatter the disease. If later, use the following:

No. 82. 1 Part oil of turpentine,
1 Part lard oil,
1 Part solution of ammonia.

Rub well on the affected parts of the throat. If the membrane in the throat do not give way, and there is increased difficulty in breathing use the following:

No. 83. 10 Grains nitrate of silver,
1 Ounce rainwater.

Mix and swab the throat well over the forming membranes, by means of a small piece of soft sponge tied over the end of a smooth, flexible piece of whalebone and saturated with the nitrate of silver. In the case of foals and calves, only half the doses named must be used, and for lambs not more than one quarter.

XV. Bleeding from the Nose.

This often occurs from various injuries to the mucus membrane of the nostrils, from hard pulling up hill, too tight a collar, and from other causes, especially if the animal be full of blood. In these cases, the bleeding is from one nostril and in drops, accompanied by sneezing. If the bleeding comes from the lungs, it will be bright red and frothy, and there will be a cough. If from the stomach, it will be black, clotted, sour and accompanied by retching.

What to do.—In simple cases tie the head up as high as possible, blow strong alum water from a tube into the nostril at each inspiration, and if obstinate, plug the nostril with pledgets of tow. Give internally one scruple of acetate of lead, to be followed in half an hour with another if necessary. In the case of an ox, two scruples may be given at a dose.

If both nostrils are involved, and the flow is continuous, only one nostril must be stopped at a time, unless tracheotomy is performed, since the horse cannot breathe through the mouth. The ox, however, *can* do so. Therefore both nostrils may be plugged if necessary.

In performing this operation (tracheotomy), on the horse, sometimes necessary in various obstructions of the throat and windpipe, a ring of the windpipe should not be severed, but only parts of two. That is, a circular flap should be excised. It should always be performed by a veterinary surgeon, except in a case where death from strangulation is imminent. In this case do not hesitate, take the lancet or sharp knife and, holding the horse's head high, cut in a foot above the breast-bone and in the center of the neck, *down to and into* the windpipe. The opening through the skin should be about two and a half inches long or even three inches, and through the windpipe from one-half to three-quarters of an inch. If a surgeon performs the operation he will be provided with a tracheotomy tube; if not, any smooth metal tube which may be inserted will do, as the spout of a tea-kettle; this must be held to its place by proper fastenings, and until the wound is healed the horse must not be allowed to put his head to the ground.

XVI. Strangles.

This is a disease but little known in America. Our distemper takes its place. It is thus described in English works: It usually occurs in young horses, highly-bred horses being more subject to it than cold blooded ones. When the animal is "breeding strangles," there is a general though slight indisposition. After a few days the neck becomes stiff, the throat swells, the tumor being hard, hot and tender. A dis-

charge from the nose takes place, the throat becomes sore, the breathing oppressed, the hair is staring, the appetite is gone, and the animal stands with half-closed eyes. At length the tumor becomes ripe enough and is opened, as is usual in distemper. It is more than probable that the disease is really the same, and that strangles and distemper are one and the same thing, only modified by conditions and climate.

OPENING THE ABSCESS OF STRANGLES.

The general treatment is the same as we give for distemper. As an application to the swelling to produce suppuration, the following is recommended:

No. 84.
1 Part laudanum,
1 Part spirits of camphor,
2 Parts spirits of turpentine.

Mix, and apply with a paint brush to the swelling. In treating either strangles or distemper, no physic should be given. Good nursing, soothing drinks, as much nourishment in the food or gruel as the animal can take should be allowed, and the strength must be kept up by every possible means, and to induce the ripening into pus of the tumor is important. Until the animal be again entirely recovered and in good health, it should have no work.

CHAPTER VI.

DISEASES OF THE STOMACH AND BOWELS.

I. SOUR STOMACH. —— II. COLIC. —— III. THE BOT. —— IV. INFLAMMATION AND RUPTURE OF THE COLON. —— V. INFLAMMATION AND BLEEDING OF THE RECTUM. —— VI. SPONTANEOUS SALIVATION. —— VII. INFLAMMATION OF THE STOMACH. —— VIII. SORENESS AND ITCHING OF THE ANUS. —— IX. CHRONIC GASTRITIS. — X. SPASMS OF THE DIAPHRAGM. —— XI. RUPTURE OF THE STOMACH. —— XII. INFLAMMATION OF THE PERITONEUM. —— XIII. STRANGULATION OF THE INTESTINES. —— XIV. FUNCTIONAL DISEASES OF THE LIVER. —— XV. PARASITES WHICH AFFECT THE LIVER. —— XVI. DIARRHEA.

I. Sour Stomach.

Animals living upon vegetable food, where the mastication or the grinding down of the substances taken into the mouth is imperfectly accomplished, or where a greedy animal is allowed to overload the stomach with food, since it thus is imperfectly moistened with saliva, are subject to acidity of the stomach, fermentation of the food, and the diseases attendant thereupon. Carbonic acid gas is evolved, and if not checked in time will sometimes cause violent and extreme distension and inflammation of the stomach, the result of decomposition, or spasmodic colic, with paroxysms of extreme agony, and sometimes the most violent rupture of the stomach ending in death.

We often see violent distension of the stomach in cattle when turned into a field of flush clover when hungry: the remedy in this case is thrusting a trochar or knife into the stomach to allow the escape of the gases. When in the horse inflammatory action has been set up it may lead to many diseases, each of which must be treated according to the symptoms exhibited.

In the first stage or that of simple acidity of the stomach, if taken in time, treatment is comparatively easy. It is called sour stomach, acute gastritis, indigestion, tympany, etc.

Causes.—Suspended digestion and consequent fermentation from overloading the stomach with improperly chewed food. This will never occur in slow feeders that fully grind and saturate the food with saliva, since in this case the appetite is fully satisfied before overloading ensues. Colic may occur by giving large draughts of water immediately after feeding, thus washing forward the food beyond the stomach. Sour stomach may also ensue from indigestible and easily fermented food, and inflammation from eating plants that irritate the stomach.

How to know it.—The first symptoms are sour stomach, simple colic, or fermentation. There is fullness, causing undue distension; then quickened, deep, but oppressed breathing; the animal is dull and stupid; there is increasing pain, and at length, if relief is not obtained, more violent symptoms set in.

What to do.—Give immediately one or two ounces of magnesia. Evacuate the bowels by means of injections of warm water. Rub the belly with considerable friction one way, from the forelegs back. If there is griping give the following:

No 85. 15 to 20 Drops oil of peppermint,
1 Ounce of laudanum.

If the weather is cold, blanket and walk the horse to assist in giving relief.

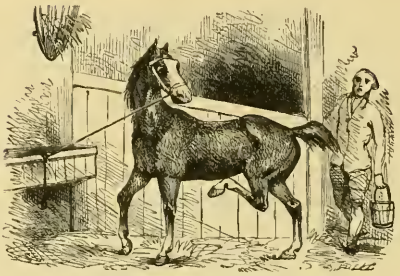
In the case of the ox, give double the dose mentioned; sheep one-quarter to one-third the dose for the horse, except of laudanum, of which give the sheep, 2 to 3 drachms.

II. Colic.

This may be of two kinds, spasmodic, or flatulent colic. The first is the result of cramps or spasmodic contractions, causing severe pain with tendency to inflammation. The other of distension of the bowels with tendency to inflammation and rupture of the coats.

How to know Spasmodic Colic.—There will be spasms of pain, with pawing, striking of the belly with the hind foot, looking round at the flanks, lying down and suddenly getting up, rolling, or lying stretched out for an instant; then suddenly rising, the horse will shake himself as the pain intermits. Again the pain returns and the same performances are gone through. There may be frequent small discharges from the bowels

and bladder, and during the attacks the pulse and breathing are accelerated.

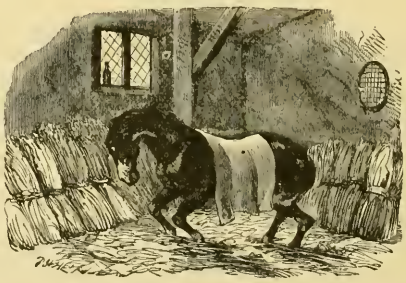


THE FIRST STAGE OF SPASMODIC COLIC.

What to do.—Relieve the pain by means of an opiate, and cause movement of the bowels. To do this in mild cases the following will be good in connection with injections of warm water:

No. 86.

½ to 1 Ounce of laudanum,
4 to 5 Drachms aloes,
1 Pint hot water.



SECOND STAGE OF SPASMODIC COLIC.

Pulverize the aloes and dissolve in the hot water. Cool as quickly as possible and add the laudanum, and give as a dose. If there is abundant formation of gas, give the following promptly:

No 87.

½ Ounce powdered aloes.
1 Ounce aromatic ammonia,
1 Ounce sulphuric ether,
1 ½ Ounce warm water.

Mix and give at once. Another colic drench in good repute is the following:

No. 88. 4 Drachms aloes,
1 Ounce sulphuric ether,
1 Ounce laudanum.

THIRD STAGE OF SPASMODIC COLIC.

Mix, pulverize the aloes in a pint and a half of hot water; cool, add the other ingredients and give immediately. If relief is not obtained, give as a second dose the following:

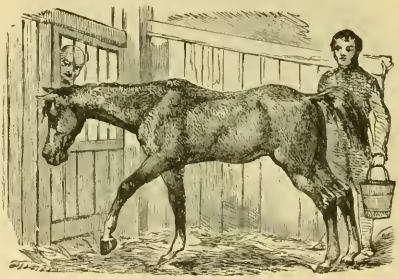
No. 89. ½ Ounce sulphuric ether,
½ Ounce laudanum,
½ Ounce spirits camphor,
½ Ounce essence of peppermint.

Mix in a pint of gruel and turn down. The symptoms in cattle are uneasiness, shuffling of the hind legs when standing. When lying down they will kick with the outer limbs. There will be moaning and twisting of the tail. The same treatment is advised as for the horse, except that one pint of linseed oil should replace the aloes. Give the doses by allowing the liquid to trickle down the throat very slowly. The doses should be double that of the horse. Swine should have castor oil one ounce in place of the linseed oil; and sheep three-quarters of an ounce. Otherwise the doses should be about one-quarter to one-fifth those ordered for the horse.

Flatulent Colic.—This disease is dangerous, and is generally the result of a chronic distension of the bowels, with tendency to inflammation and rupture of the coats.

It may be the result of some other disease, or appear as a consequence of the spasmodic form; or, may be produced by the same causes as those assigned to the acute form.

How to know it.—The expression of pain is constant but not so acute. The pulse is rapid and feeble, with difficult breathing; the feet and ears are cold; the abdomen is tense and swollen, and it sounds drum-like when struck. The animal is weak and sometimes delirious. The intestines are painful (sore) as is shown by the cautious manner of lying down: if, indeed, the horse lies down at all.



FIRST STAGE OF FLATULENT COLIC.

What to do.—Be careful about giving purgatives. Act by injections of soapsuds and oil of turpentine; removing the contents of the impacted rectum with the well oiled hand. Give the following injection:

No. 90. ½ Pint oil of turpentine.
1 Quart of soapsuds.

HORSE DYING OF FLATULENT COLIC.

Repeat in half an hour if necessary. If there is great distension puncture the large intestine, or, where the sound when tapping with the

knuckles is most drum-like, plunge in a trochar and allow the gas to escape through the cannla. Give the following according to circumstances:

No. 91. ½ to 1 Ounce laudanum,
2 to 4 Ounces tincture assafœtida
Mix in a pint of gruel.

If the colic is the result of disease and exhaustion, with much swelling of the belly, try the following:

No. 92. ½ Ounce chlorate of potash,
¼ Ounce sulphuric ether,
½ Pint water.
To be given in a half pint of gruel.

Later in this disease when it is required to act moderately on the bowels the following will be found useful:

No. 93. ½ Ounce chlorinated soda,
2 to 3 Ounces aloes.

Powder the aloes and dissolve the whole in a pint of warm water, and give when cool. During recovery, the health of the animal must be attended to. Give easily digested food; avoid large draughts of water, and over feeding. Give good grooming; blanket if necessary, and keep the circulation active by hand rubbing of the body and limbs.

III. The Bot.

The female bot fly, *Œstrus-equi*, is too well known to need description. They lay their eggs on the legs, flanks, and other portions of the horse's body easily reached. The animal in licking its body takes the egg into its mouth and being swallowed they hatch, and the young fasten themselves by means of their hooks to the mucous membrane of the stomach. Here they live and grow and the next season become mature and are passed from the animal, and undergo their transformation to the perfect fly in the earth. So long as the animal is in perfect health they do little if any harm. But in case of disease or insufficient food they become troublesome. Or if they exist in great numbers when nearly or full grown and they are passing from the animal, they sometimes cause severe injury by attaching themselves to the sensitive lining of the bowels. This irritation is not easily distinguished from other forms of indigestion or colic.

In the Spring when the animal is hungry, and there is indication of intestinal difficulty, they may be suspected. If the horse turns up his upper lip, and if the edges of the tongue are red and fiery looking, it

will be evidence of their existence. At this time physic will hasten them away. A usual remedy is to give once a day for three days, 1 drachm sulphate of copper, to be followed at the end of the time with 4 drachms of Barbadoes aloes, and repeat at the end of a week if necessary. Or the following will be found safe and effective:

No. 94.
1 ½ Drachms calomel,
1 ½ Drachms powdered savin,
2 Drachms powdered assafœtida,
30 Drops oil of male shield fern.

Make into a ball with molasses and linseed meal, to be given at night and followed next morning with 4 drachms of aloes.

In the South, Azedarach (pride of China) is grown around stables for its supposed efficacy in destroying bots by being eaten by horses. If so, it can only be while the bots are quite young. Since, after acquiring some age and becoming fastened to the stomach, they resist alike, strong acids, alkalies, irrespirable gases, narcotics and mineral poisons.

Colics, etc., arising from bots, may be treated by anti-spasmodics as given under that head. As a preventive against bots, keep the long hairs of the jaws, breast and fore-limbs trimmed close, and apply a little oil daily; and brush off any eggs that may be found. Animals kept in stables and well groomed are seldom troubled with bots.

ŒSTRUS HEMORRHOIDALIS.

2.—Eggs magnified 3.—The Bot. 4.—The Crysalis 5.—The male fly.

Another bot fly (*Œstrus Hemorrhoidalis*) resembles the *œstris equi* quite closely, and deposits its eggs upon the lips and upon the hairs under the jaw. Dropping into the food, they are swallowed and fasten to the stomach in dense clusters. The larvæ are somewhat longer in proportion to their bulk than the species *equi*.

When ready to pass away they sometimes cause irritation of the bowels and anus by sticking there. The same means must be used for this species as for the other.

Intestinal worms.—There are various intestinal worms that inhabit the

horse, at least three species of tape worms and seven of round worms. The ox has two tape worms and seven round worms. The sheep one tape worm and seven round worms. A good vermifuge for tape worm is the following:

No. 95.
¼ Ounce powdered aloes,
¼ Ounce powdered assafœtida,
1 Ounce oil of turpentine,
1 Ounce sulphuric ether.

Mix the two first in hot water and when cold add the turpentine and ether, and give in gruel as a drench. If the animal is weak and out of condition, give an ounce of areca nut, and follow with nourishing food. For round worms, if suspected, give 4 drachms of aloes, and if worms are found in the dung, give immediately on an empty stomach the following:

No. 96.
1 Drachm oil of male fern,
2 Ounces oil of turpentine,
½ Pint linseed oil.

Follow this for three days with a dose of 1-2 drachm sulphate of copper. For thread-worms in the rectum give an injection every two days for a week, of the following:

No. 97.
2 Drachms oil of turpentine,
1 Pint linseed oil.

Inject every day for a week, a purgative dose to precede the first injection. A strong decoction of wormwood is also a good vermifuge used as an injection.

IV. Inflammation and Rupture of the Colon.

This disability is usually the result of colic. If through constriction of one part and expansion of another rupture actually occurs, the animal will die. The colon is the largest division of the intestinal canal. Beginning at the *cæcum*, (the commencement of the large intestine) it ascends by the right kidney, passes under the hollow part of the liver to the spleen, thence descends by the left kidney and passes in the form of an S to the upper part of the *os sacrum*. It thence runs straight to the anus and this part of it is called the *rectum*.

How to know Rupture.—The sides of the flanks will be distended, there will be fever and heat, and the animal will give evidence of its severe suffering. The pulse will be hard, wiry and quick, the belly tender, the

ears cold; the pain will be constant, and medicine will increase it. There will be great and rapidly increased weakness. The symptoms are directly opposed to those in colic.

What to do.—In the first stages of the disease give the following, in lime water, every hour or two until three or four doses are given:

No. 98. 20 Drops tincture of aconite,
½ Ounce laudanum.

In very severe cases a hypodermic injection of 40 grains of chloral hydrate, to be at once followed by one of 3 grains of morphia, to be repeated in an hour; this, however, must be performed by a competent surgeon. The following may be given by the mouth:

No. 99. 10 Grains morphia,
1 Ounce chloral hydrate.

Give in sweetened water, and repeat every two hours until three or four doses are given, or until the symptoms abate.

Extensive fomentations to the bowels will be beneficial. This may be done by folding a blanket inside a rubber cloth which is fastened over the back Keep the blanket soaked with water as warm as can be borne.

If the disease be inflammation of the bowels, or enteritis, whether it does or does not follow an attack of colic, among the symptoms will be stretching of the lips upward. This may however be done when there is abdominal irritation of any kind. If the inflammation be severe, so shown by increased heat and fever, an ammoniacal blister may be applied. Dilute strong liquor of ammonia with six times its bulk of cold water, saturate a cloth with it and lay it on several folds of blanket, to be held to the belly by four men who will not mind the fumes. The manner of holding it is shown in the cut on next page.

NOSE STRAINED UPWARD.

Watch the action of the ammonia. It may blister within ten minutes, or it may take twice that time. Do not allow it to eat the skin, else a bad sore will be the result. When the proper effect is produced remove it at once. It should really be applied only under the direction of a veterinary surgeon. They are, unfortunately, not always near. In this case, to save life, something must be risked. The worst inflammatory symptoms being stayed, give every two hours until three or four doses are given, or a favorable result is obtained, the following:

No. 100. 30 Grains calomel,
1 Ounce laudanum.

Mix in half a pint of gruel. As the animal begins to take food it should have bran and oatmeal mashes, mixed with tea of slippery elm bark. Cooked food should be given, and if carrots are at hand, give a mess of them boiled every day. Skimmed milk is excellent if the animal will drink it.

APPLICATION OF AN AMMONIACAL BLISTER.

V. Inflammation and Bleeding of the Rectum.

This is a difficulty that often accompanies or follows inflammation of the bowels.

How to know it.—There will be heat and swelling, with or without protrusion and bleeding of the rectum.

What to do.—Wash the parts with a weak solution of salt and water, and also use injections of the same as often as may seem necessary. If this do not give relief add a slight infusion of chlorate of potash and golden seal.

VI. Spontaneous Salivation.

Causes.—This infirmity is generally the result of or symptom of some other affliction. It is often produced by something the animal has eaten. White clover will produce it. Caries and other diseases of the teeth: dentition, paralysis of the lips, ulcers of the mouth, irritating food, irritation by the bit, and especially from medicaments attached to the bits of horses by ignorant stable men. It occurs as a free discharge of saliva in frothy masses or in stringy filaments, with frequent swallowing, thirst, and generally indigestion.

What to do—Remove the cause. If the cause is from alkalies, wash the mouth with weak vinegar. If from acids, use lime water. If from

caustic salts, use white of egg, or tea of slippery elm bark. If there is inflammation with costiveness, open the bowels with injections of warm water, or soapsuds, and wash the mouth frequently with vinegar and honey. If this do not effect a cure wash the mouth with alum water. If there are ulcers touch them with a feather wet with the following:

No. 101. 10 Grains lunar caustic,
1 Ounce distilled water.

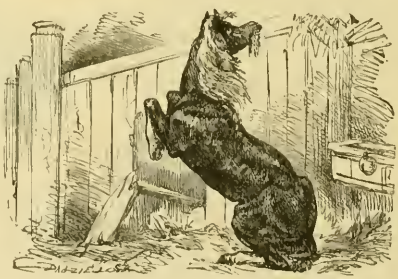
If there are tumors with pus, lance them. If there is sloughing wash with the following:

No. 102. 1 Drachm solution of permanganate of potassa,
1 Pint rainwater.

Give plenty of cool water, so the animal may take it at will, and feed with soft or boiled food, and if there is much swelling, keep the head tied up.

VII. Inflammation of the Stomach.

Causes.—This disease is not common in horses, and occurs rarely from eating vegetable poisons, and more generally from poisoning by arsenic given in the food by ignorant stable-men, to make the horse carry a shining coat and foam at the bit. It is also produced by the licking of external corrosive applications, thus producing acute gastritis.



HORSE SUFFERING FROM ACUTE GASTRITIS.

The symptoms are various in unison with the causes producing them. These are, refusing food, extreme thirst, redness of the nasal and conjunctival membranes, discharge of ropy saliva, frequent eructations with fetid smell, colic, rolling on the ground, pawing, striking at the abdomen, etc.; tucked up flanks, heaving, panting, small, quick pulse, violent

straining, passing of mucus in large quantities, protrusion and inflammation of the opening, glances at the abdomen, prostration of strength, convulsions, madness and death.

What to do.—The first thing, if possible, is to find out what caused the trouble. If this cannot be found, give at once:

No. 103. 3 Ounces sulphuric ether,
3 Ounces laudanum,
4 Ounces carbonate of magnesia,
1 Quart cold gruel.

Mix and give as a dose. If the pulse be low, add to the above one drachm carbonate of ammonia. If the animal is weak, but able to swallow, take plenty of time, do not use violent means. If there is paralysis of the throat, or the horse is in delirium, the dose must be injected through the nostril, by means of a syringe pump and pipe, or horse catheter. See article tetanus. As soon as there is evidence of recovery, and in fact whenever the animal will take it, thin starch or gruel of flour should be freely given to sheath the mucus surfaces.

VIII. Soreness and Itching of the Anus.

This is a disease following inflammation and disease of the rectum, and also produced by other causes. The anus or orifice of the rectum becomes sore. There is a peculiar dryness with scurf, and to relieve the itching the horse sometimes rubs the roots of his tail until the hair is entirely worn away.

What to do.—Attend to the general health of the horse, to keep the bowels in a natural condition. Mix a little fine salt with lard oil, and keep the parts well oiled, with friction. If the trouble be inside, a little goldenseal well rubbed down with salt butter and passed carefully within the anus, will give relief. If the difficulty is occasioned by worms, see that article.

IX. Chronic Gastritis.

Causes.—Anything which impairs the digestive functions may produce this disease. It is, however, in its chronic form, extremely rare. The ordinary food will be refused, and the animal will persist in eating foreign substances—old lime mortar, the wood work of the stable, earth, litter and bedding.

How to know it.—There is a dry cough; the membrane of the mouth and nostrils are dry and pale; the breath is tainted; the evacuations

smell badly; the eyes are sunk, the coat dry and ragged; the horse loses condition and becomes pot bellied; the anus is lax and prominent.

What to do.—The cure will take time. Prevent the animal from indulging its unnatural appetite. The following made into a ball will be indicated.

No. 104.
½ Grain strychnia,
1 Drachm biehromate of ammonia,
½ Drachm extract of belladonna,
1 Drachm powdered gentian,
½ Drachm sulphate of zinc.

Give this as a ball once a day. If after continuing several days there is no improvement, give the following:

No. 105.
½ Ounce liquor arsenicalis,
½ Ounce tincture ipecac,
1 Ounce muriated tincture of iron,
½ Ounce laudanum,
1 Pint of water.

As the animal gets stronger give an ounce of sulphuric ether daily in a pint of water.

If the animal has simply chronic indigestion, that is, the disease does not show in the severe form we have depicted, to improve the general health the following will be indicated:

No. 106.
1 Ounce powdered assafœtida,
1 Ounce powdered golden seal,
2 Ounces powdered ginger,
2 Ounces powdered poplar bark,
5 Drachms powdered sulphate of iron,
1 Drachm powdered red pepper,
1 Pound of oatmeal,

Mix, divide into sixteen messes, and give one every night in the food. In addition to this the following will make a good appetizer:

No. 107.
1 Quart brandy,
1 Ounce salt.

Mix and give a wine glass full night and morning in gruel, just before the food. The food given must be of the very best, and that which is easily digested. Boiled oats, shorts and carrots, with sufficient good hay to distend the stomach. Keep the animal muzzled during the intervals of feeding, to prevent foul feeding. That is, eating litter or other injurious substances. If acidity of the stomach be shown, moisten the hay given, and sprinkle it freely with magnesia.

X. Spasm of the Diaphragm.

Causes.—Hard riding or driving of a horse constitutionally weak.

How to know it.—If the horse is being ridden, there will be a sensation to the rider as though a sudden blow was given inside the horse. This is from spasmodic action of the diaphragm (the midriff or muscle separating the chest from the abdomen) in drawing the breath. If the animal is still driven forward it sometimes suddenly falls and dies of suffocation.

What to do.—There is no cure. Relief may be given by clothing the animal. Lead him to the nearest stable or shed and give the following:

No. 108.
3 Drachms aromatic spirits of ammonia.
3 Drachms tincture of ginger
3 Ounces laudanum,
1½ Ounces ether.

Mix in a pint of oil or gruel and give as a drench, or give the following:

No. 109.
½ Drachm camphor,
1 Drachm powdered ginger,
1 Drachm carbonate of ammonia.

Mix with sufficient linseed meal and hot water to form a ball. Repeat at an interval of three hours if relief is not afforded by the first dose.

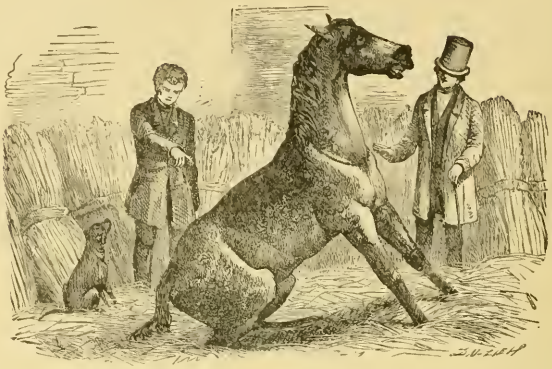
A horse subject to this affection should have only slow work. The diaphragm may be strengthened by giving for some time a daily dose of one drachm of powdered sulphate of iron in the food.

XI. Rupture of the Stomach.

Rupture, when it ensues, ends pretty surely in death. Rupture of the stomach is produced by working or driving a horse until he is very hungry and then feeding and watering unduly. The only symptoms which show, are violent colic, and the tenseness of the tissues. There are many ruptures where animals die, and the owner does not know what is the difficulty. If the mischief has proceeded to rupture, the animal may as well be killed.

One of the positions assumed by a horse suffering from abdominal injuries, is this: He will persistently sit on his haunches. Animals will assume this position and yet occasionally recover. Another position assumed is, for the animal to kneel and support himself upon his hind

legs. Such unnatural positions show the intense pain which leads to such attitudes to get relief.



UNNATURAL ATTITUDE INDICATIVE OF ABDOMINAL INJURY.

XII. Gorged Stomach.

When this occurs from over feeding, the bowels should be immediately relieved by removing the contents by repeated injections of warm water. Let the animal be gently walked about, and warmly clothed in cold weather. The operator must act according to circumstances. If discov-

POSITION ASSUMED BY HORSE SUFFERING FROM ABDOMINAL INJURY.

ered early, or before colic sets in, give the following to evacuate the bowels after having relieved them by injections:

No. 110.

6 Drachms powdered aloes,
1 Ounce sirup of buckthorn,
1 Ounce tincture of ginger.

Dissolve the aloes in a pint of warm water, add the buckthorn and ginger, and give as a drench.

XIII. Inflammation of the Peritoneum.

Inflammation of the lining membrane of the abdomen is likely to occur in all domestic animals. In ruminants the right side is most affected, and the animal will stand with its feet well together.

Causes.—Injuries either from rupture of the stomach or intestines, or from injuries to the abdominal walls, exposure to chill or cold, or giving an exhausted horse a wet bed to lie on.

How to know it.—There may be colic, or steady pain. This will be acute when the affected parts are pressed. There may be chill and fever alternately, and loss of appetite. The pulse will be rapid and hard, and the breath quick and catching, but when effusion takes place the breathing will be deep and easier; the pulse will soften, the belly will be pendent, and there will be fluctuations when handled, from the water contained.

What to do.—In the early stages, give full doses of laudanum; 1 to 2 ounces, as may be needed, to allay pain and keep the bowels inactive. Apply mustard poultices to the abdomen, or in extreme cases the ammoniacal blister as previously described. Frequent injections of thoroughly cooked gruel may be thrown into the rectum, but until the worst symptoms are past the animal should take nothing into the stomach. As the disease progresses favorably, great care should be exercised in feeding. Oat or rye meal gruel may first be given. If these agree well, give warm soft bran-mashes, with a little oat meal added, and at length hay and sound oats.

In case absorption of the effusion of water in the cavity does not take place, which may be known by regular and ample staling, give 6 drachms potassa nitrate, daily, until the kidneys act. If tonics seem to be demanded, give daily doses of 1-2 drachm oxide of iron.

XIV. Strangulation of the Intestines.

This is produced by various causes, the result of colic and rupture being the most frequent. Strangulation may be produced by the formation of false membranes, by the involvent of the intestines, by the rupture of the mesentary, or by the rolling on itself of the intestine until it is entirely strangulated. In this as in other abdominal difficulties, the animal will often assume unnatural positions, as shown in the article Rupture of the Stomach. If it be a ruminant, and in good flesh, it is better to kill the animal at once. Some forms of strangulation in cattle

of sufficient value, may be remedied by a veterinary surgeon. In this case, give laudanum in 2-ounce doses to keep the animal quiet until the doctor arrives. Relief is obtained by cutting into the side and releasing the intestine. For the horse give opium in one or two drachm doses as the nature of the case may seem to require to relieve the pain, and trust to nature to effect a cure by releasing the parts naturally.

XV. Functional Diseases of the Liver.

The liver of the horse is not particularly subject to disease. It was formerly supposed to be almost entirely exempt, but later researches show it to be an agent, through obstruction, and the principal local seat of various disorders, as diabetes, blood poisoning from imperfect oxygenation of the albuminoids, etc.

How to know it.—In active congestions of the liver, which is the disease most usually prevalent and this principally in the South, there may be sluggishness, irregular bowels, abundant liquid discharges of deep yellow or orange colored dung. There will be extreme and painful prostration, the eyes will be sunken, the pulse excited, and the limbs will tremble. There may be colicky pains. If the last ribs are struck with some force, extreme pain will be shown. If the horse faints and there are pallid mucus membrane, with quick and weak pulse, it may be conjectured that rupture of the liver has taken place. In this case, the end is death. The illustration we give will show the test alike for ruptured liver and spleen.

TEST OF HEMORRHAGE FROM THE LIVER.

What to do.—In the beginning, that is when the pulse is strong, free bleeding will often check the disease. When the pulse is weak, blood must not be drawn; or, if the blood does not flow freely, close the orifice at once.

Apply mustard poultices to the limbs. Give one pound of sulphate of soda dissolved in a quart of water, to deplete the portal system and liver. Apply ice to the last ribs to check effusion. Apply a blister over the region of the liver. Continue the sulphate of soda in doses of one to four ounces daily.

During the attack and recovery the animal must have pure air, and

soft, easily digested food, and as recovery ensues, daily moderate exercise must be given.

Inflammation of the liver is rare. If congestion has proceeded to inflammation the region of the last rib will be very tender. There will be quickening of the pulse. The mouth will be hot and clammy; the bowels may be at first loose, yellow and bilious, but soon become costive. The heat of the body is raised: patches may appear on the mucous membranes; and the limbs, especially the hind ones, will swell.

What to do.—In this case all bleeding should be avoided. Give as a purge a pound of sulphate of soda (glauber salts) aided by injections of warm water. After the bowels are opened, keep them so with small doses of glauber salts, six ounces, or, cream of tartar four ounces daily. If the horse eat anything it must be very light mashes, pulped roots or fresh grass. As the horse improves, give twice a day two ounces of Peruvian bark or two drachms twice a day of gentian.

XVI. Parasites which Infest the Intestines.

The general symptoms for intestinal worms, in large quantity, are general ill health. The animal will lose condition: the skin will be scurfy, dry and often itching; the animal will become hide bound and pot bellied; the appetite will be irregular but voracious; there will be fetid breath, diarrhœa, passing of mucus with the dung, colicky pains, swelling, itching and puffy anus, and especially the passage of the worms or their eggs will be certain proof. The horse will raise the upper lip and rub it against anything near. Colts will pick and bite the hair from the body and limbs. The annexed cut will give a good general idea of an animal suffering from worms.

COLT PICKING HAIR FROM ITS LEG, GIVING PROOF OF WORMS.

Besides the bot, already treated of, which inhabits the stomach, there are those of the intestines proper. These are the tape worm, round headed and flat headed, and five species of round worms.

What to do.—Vermifuges are without number, some general in their nature, and others specific for particular classes. When worms are suspected, and the owner of the animal is not sure of the reality, it is safe

to give a purge and watch the droppings. The following is a good vermifuge drench:

No. 111. 4 Drachms aloes,
1 Ounce powdered male fern,
20 Drops oil of worm seed.

Give this in a pint of warm gruel an hour before feeding in the morning.

If it be found that there are tape worms, if the horse is weak, give an ounce of areca nut fasting and follow with 4 drachms of aloes. If the animal is strong, give an ounce of oil of turpentine in an ounce of water. In four hours give another dose and follow in an hour with 4 drachms aloes. In the case of common pin worms, (*Sclerostomum Equinum*) and all worms inhabiting the bowels except the tape worm, the following vermifuge will act kindly:

No. 112. 1 Drachm tartar emetic,
½ Drachm powdered ginger.

Mix with enough linseed meal to form a ball, then moisten with hot water and give a dose daily for a week, before feeding. Follow with a dose of one pint of linseed oil, wait another week, and repeat as before. Then give good generous diet, with tonics daily, say 2 drachms sulphate of iron, or 4 drachms gentian in the food.

For worms lodging in the gut near the rectum, give an injection of a strong decoction of wormwood or tansey. The prevention of worms is to pay attention to the water the animal drinks, to be careful of dog's droppings in the pasture, and to give sound grain and hay as food, since liberal feeding and good general care will often extirpate the parasites. For other vermifuges see article 3 of this chapter.

XVII. Diarrhea.

Diarrhea is a condition of frequent watery discharges from the bowels, and may be produced by so many causes, as irritating and indigestible food, worms, severe purgation by medicines, disorders of the liver, or constitutional tendency, that no general rule can be given. The owner of the animal must find the cause before proceeding intelligently to give relief. The most we can do is to give some general indications.

Sometimes diarrhœa is an effort of nature to rid the body of injurious matter; then the effort should be aided. Early in the effort give the horse a pint of linseed oil, or if an active purge be required, a pint of castor oil. If the diarrhœa does not cease check it with ounce doses of laudanum and follow with tea of slippery elm bark, or linseed. If the

difficulty refuse to give way, doses of 2 scruples of tannin may be given, or, doses of 3 drachms of catechu every hour until checked. The ox requires double the dose. Follow with tonics, say 4 drachms of gentian daily, or one ounce of peruvian bark, with sound, easily digested food. If caused by bad water, throw a handful of charcoal in the water before giving it to drink. The following will be found beneficial in the several cases mentioned.

For sour and fetid discharges mix the following ingredients in the food twice or thrice daily.

No. 113.
1 Ounce powdered chalk,
1 Ounce bisulphate of soda.

For sour discharges with griping, take:

No. 114.
1 Drachm powdered opium,
1 Drachm powdered chalk,
20 Drops carbolic acid.

Form into a ball with linseed meal and molasses.

If the bowels are simply in an irritable, relaxed condition, use the following:

No. 115.
1 Ounce powdered chalk,
1 Ounce catechu,
1 Ounce ginger,
1 Drachm opium.

Make into a ball with linseed meal and molasses.

When the diarrhœa is the result of violent medical purging, try the following:

No. 116.
2 Ounces laudanum,
2 Ounces powdered chalk.

Mix, and give in a quart of thin starch, or flour gruel. For excessive and continued purging, give at one dose the following:

No. 117.
1 Ounce laudanum,
1 Ounce sulphuric ether,
20 Grains tannic acid.
Mix in a pint of flax-seed tea.

Astringent injections may be given as follows:

No. 118.
2 Ounces laudanum,
2 Drachms acetate of lead,
1 Quart starch water.

Inject half of this and follow with the remainder in three hours, if necessary, or give at one injection the following:

No. 119. 4 Drachms tannic acid,
1 Pint starch water.

In case of cattle the same quantities may be used, but when given by the mouth it must be made to trickle slowly down the throat.

CHAPTER VII.

DISEASES OF THE LIVER, URINARY ORGANS, ETC.

I. JAUNDICE. —— II. ENLARGEMENT OF THE SPLEEN. —— III. INFLAMMATION OF THE KIDNEYS. —— IV. PROFUSE STALING, OR DIABETES. ——V. BLOODY URINE, OR HÆMATURIA. —— VI. THICK AND ALBUMINOUS URINE. —— VII. WHITE, OR LIME URINE. —— VIII. GRAVEL, OR STONE IN THE BLADDER. ——IX. SUPPRESSION OF URINE. ——X. INFLAMMATION OF THE BLADDER. ——XI. FOUL SHEATH. ——XII. RUPTURE OF THE BLADDER. —— XIII. SPASM OF THE URETHRA. ——XIV. INFLAMMATION OF THE ORGANS OF GENERATION.

I. Jaundice.

The horse is subject to but few diseases of the liver. Jaundice or the yellows, is a condition in which the visible mucous membranes, the skin (if it be naturally white) the urine and the tissues are stained yellow, not by non-secretion of the bile from the blood, but by the re-absorption of bile already secreted.

Causes.—Obstruction of the bile duct from any cause. Obstruction of the bowels hindering the proper discharge of the bile. Diminished fullness of the capillary vessels of the liver from obstruction of the hepatic artery or aorta. And from undue secretion of the bile in cases of congestion of the liver.

In solid hoofed animals the blood is easily dissolved. In flesh-eating animals it is not so. Hence, although there is often a jaundiced appearance of the membranes in horses, it is comparatively harmless.

How to know it.—There will be a general coloration of the tissues. The mucous membrane will be yellow. The urine will be yellow. In obstruction of the bile duct the dung will be fetid, and of a clay color from being devoid of bile.

What to do.—No general rule can be laid down. The following is a good remedy for torpidity of the liver, when there is general dullness and biliousness.

No. 120.
1 Pound Epsom salts,
1 Pound Glauber salts,
1 Pound common salt,
1 Ounce essence of ginger,
1 Gallon warm water.

Mix and give a pint from one to three times a day until a gentle but full purgation is produced. Follow this up with daily doses of one scruple of podophyllin.

This remedy will also be indicated for cattle, except that they should have the following formula as a purge instead of No. 120:

No. 121.
½ Pound sulphate of magnesia,
½ Pound common salt,
2 Ounces powdered ginger.

Give this dose in two quarts of water once a day until a free evacuation of the bowels is produced, giving also daily one scruple of podophyllin.

Saline purges do not always act kindly on horses. If so the following will be indicated if there is considerable congestion:

No. 122.
30 Grains calomel,
1 Drachm aloes,
2 Drachms soap,
4 Drachms powdered rhubarb.

Mix with molasses into a ball and give twice a day until a moderate operation of the bowels is had.

If the disease occurs in the Spring, turning upon succulent grass, especially where dandelion is plenty, will generally effect a cure.

II. Enlargement of the Spleen.

The pancreas and the spleen are subject to a variety of diseases, very difficult to determine. The pancreas is a gland which secretes the pancreatic juice, by which emulsion takes place with the fatty aliments by means of a duct leading into the intestines. The presence of fatty matter in the dung will imply a suppression of these juices. If there are sharp, colicky pains without fever, obstruction of the duct by calculi may be suspected. If there is general fever, with pain and tenderness behind the last rib on the right side, inflammation may be suspected.

For calculi use fomentations of hot water over the parts affected, and

give anti-spasmodics, chloral hydrate in half ounce doses daily, or hyoscyamus extract two drachm doses, or belladonna two drachm doses, as the case may be.

If there is inflammation give laxative medicines, one and a half ounces dandelion; blister the right side, and confine the animal to light diet.

For suppressed secretion give one ounce doses of sulphuric ether.

So far as affections of the spleen are concerned, it is an involvent in diseases of the liver and other glands. In highly fed animals enlargement ensues; in badly fed ones degeneration or wasting. Obstructed circulation through the liver will engorge the spleen almost to rupture sometimes. In tuberculosis, cancer, glanders and blood poisoning it is affected. Anthrax and other fevers tend to enlargement of the spleen, sometimes to rupture. So little is really known of the spleen and its true functions, that but little can be done except by giving general attention to the health and by means of tonics and good nursing to build up the health.

III. Inflammation of the Kidneys.

SYMPTOMS ATTENDING DISEASES OF THE URINARY ORGANS.

Causes.—Inflammation of the kidneys, Nephritis, is produced by a variety of causes. Blows on, or sprains in the region of the loins, calculi, the excessive use of diuretics to which some stablemen are prone, musty fodder, or that which contains irritant plants, etc.

How to know it.—There will be more or less fever, sometimes a high fever: colicky pains; looking at the abdomen; the horse will lie down with extreme caution; frequent passages of urine in small quantity, but

very high colored, sometimes containing blood and even pus; the legs swell uniformly from the hoofs up; the pulse is rapid, the bowels costive and the breathing excited; the horse straddles in his gait; this, however, is a general characteristic of all diseases of the urinary organs, but in severe inflammation it amounts almost to helplessness.

There is, however, one test that is constant: there is extreme tenderness of the bony processes about six inches from the spine in the loins, pressure over the kidneys will show the terrible pain from the crouching attitude the horse assumes.

TEST FOR INFLAMMATION OF THE KIDNEYS.

If the urine is examined under a microscope, the fibrinous casts of the kidney tubes will be found. In chronic cases, stocking of the legs, casts in the urine, more or less tenderness upon pressure of the loins, and general ill health, may be all that will be observed.

What to do.—In acute cases, if there is a strong pulse and the animal is full of blood, bleeding may assist a cure. It is not always safe, except under the advice of a veterinarian of modern practice. Bleeding should never be practiced except in the earliest symptoms. Give an active cathartic.

No. 123. 1 Drachm calomel,
4 Drachms powdered aloes,
Make into a ball with linseed meal and molasses.

Wrap the loins in woolen blankets and foment thoroughly with an infusion of a handful of digitalis leaves in a pail of boiling water, putting it on as warm as the hand will bear it; or wring a sheep skin out of hot water and apply the flesh side, changing as often as may be necessary.

To assist the evacuation and ease the pain give injections of linseed tea, one quart, to which an ounce of laudanum is added. Get up a good sweat if possible. This will relieve the kidneys. Keep the bowels gently open with laxatives and relieve the pains with anodynes, and as the animal improves, give bitter tonics, 3 ounces of Peruvian bark daily in three doses; or an ounce of gentian in two drachm doses three times a day.

IV. Profuse Staling, or Diabetes.

This disease, called by various names, as diuresis, diabetes insipidus, poluria, etc., is simply an excessive secretion of urine, causing loss of flesh, weakness, and at length terminating in exhaustion and a general breaking down of the system.

Causes.—The most common cause is dosing with quack medicines, a favorite pastime of ignorant stablemen, especially for "the water." It is also produced by musty hay and grain, new oats, distillery slops, acid diuretic plants, or any cause irritating the stomach and at the same time stimulating the kidneys.

How to know it.—There is excessive thirst, profuse and frequent staling, of pale colored urine, thin, and with little odor; loss of condition and spirits; the appetite fails; the skin is hard and dry; the hair harsh; the pulse will be weak, whether fast or slow; depraved appetite for licking noxious substances.

What to do.—Change the food at once, well seasoned hay and grain, with linseed tea given freely in the drink. The horse must not suffer from thirst, but inordinate drinking should not be allowed. Iodine is one of the chief specifics in this disease. The following will be a good formula, to be given three times a day in water:

No. 124. 20 Grains iodine,
1 Drachm iodide of potassium,
4 Drachms carbonate of soda.
Mix, and give in water.

Or, give daily the following:

No 126. 2 Drachms phosphate of iron,
2 Drachms iodide of potassium,
4 Drachms Peruvian bark.
Mix, and give once a day in water.

If this does not soon show a disposition to check the disease, add 15 to 20 grains of creosote daily.

Another good formula, to be given once a day, or in bad cases twice daily, is the following:

No. 126. 30 Grains iodine,
2 Drachms sulphate of iron,
½ Ounce powdered gentian.

Give as a ball, made with molasses and linseed meal. If four or five doses do not show decided effect discontinue. Six or seven days should effect a cure.

V. Bloody Urine, or Hæmaturia.

Causes.—Sprains or bruising of the loins, stone in the kidneys, urinary passages or bladder; blood poisoning.

HORSE SUFFERING FROM BLOODY URINE.

How to Determine the Condition.—If from local irritation, the blood being in a healthy state, there will be clots of blood passed, and fibricious casts of the urinary tubes entangling blood globules. These may be seen with a good lens. If there is gravel more or less gritty matter will be passed. If from blood poisoning, the tests must be made by a veterinary surgeon, from the urine, who can then prescribe the proper treatment.

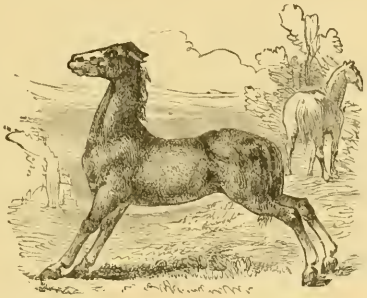
What to do.—The general practice is to give sound food, good shelter, mucilaginous drinks, as linseed or slippery elm tea, or marsh mallow tea. Also acid astringents, vinegar, buttermilk, a weak decoction of white oak bark. If the passages are profuse apply cold water to the loins. If there is inflammation foment with warm water (cloths saturated with hot water) and follow with a mustard plaster. If the bowels are inactive, give the following:

No. 127. 4 Drachms aloes,
1 Ounce cream tartar.

Mix in one and a half pints of warm water and give when cool, aiding the operation by an injection of one quart of soap suds and four ounces oil of turpentine.

VI. Thick and Albuminous Urine.

This disability in horses, characterized by a thick, ropy, albuminous discharge of urine, is quite common in its milder forms, being an attendant on extensive inflammation of important organs, on rheumatism, fevers, and some conditions of blood poisoning. It is especially attendant on inflammation of the kidneys, both acute and chronic, attended with degeneration and shedding of the epithelium (the layers of cells) lining the kidney tubes.



POSITION ASSUMED BY HORSE HAVING ALBUMINOUS URINE.

How to know it.—There are two special positions assumed by horses suffering from severe secretion of albuminous urine. One is the stretched out position. In the other the back will be roached, as seen in the cut. In its mild stages the urine is thick, ropy, mucilaginous; when it first begins to flow, of a reddish-brown color, but changing to a more natural condition, ending with a whitish, milky fluid; sometimes the reverse; commencing white. When the disease is farther advanced the urine is thicker, more deeply tinged, and sometimes offensive to the sense of smell. It may degenerate into a number of forms, and finally terminate in Bright's disease of the kidneys.

What to do.—Place the animal where it may be comfortable; clothe warmly. If there is inflammation of the kidneys, foment with a sheep skin wrung out of hot water; or better, with an infusion of a handful of digitalis (Foxglove) in a pail of scalding water, and use other measures recommended in this article. If it be thought necessary to liquify the urine, not always beneficial, prepare the following:

No. 128. 1 Ounce powdered assafœtida,
2 Ounces powdered juniper berries,
8 Ounces powdered poplar bark.

Mix, divide into eight parts, and give one night and morning in the food.

The real animus should be to remove the cause, which, as we have stated, is various. Attend to the general health of the animal, keep the bowels open by a free use of bran mashes and other food of an opening nature. Give a laxative if necessary—say, 5 ounces salts, and Peruvian bark 1 to 2 ounces daily at two or three doses.

VII. White, or Lime Urine.

The urine is one of the agents used by nature to pass away the excess of calcareous or other stony matter from the body. So long as the conditions are normal, even when limy secretions are excessive, it may be nature's means of removing this excess. When the urine becomes albuminous, the calciferous matter unites with the albumen, and the result is calculi.

How to know it.—A white matter will be passed at the end of each urination, or the urine may become decidedly limey.

What to do.—Attend to the general health of the horse, give none but sound oats and Indian corn, and sweet clean hay from upland meadows.

Sand-like Deposit in the Bladder.—Sometimes a sand-like deposit, or soft magma is made in the bladder, and to such an extent that the urine flows involuntarily and constantly by drops. The remedy is by means of a stomach pump and catheter, to fill the bladder with water. Shake up the contents with the hand introduced through the rectum, and allow the water to flow through the catheter. So proceed to again pump full and empty until all the deposit is cleaned.

When an animal is inclined to this disability, 1 drachm of caustic soda given daily in the water will correct the secretion.

VIII. Gravel, or Stone in the Bladder.

The existence of urinary calculi, whenever found, is due to the deposit of mineral matter around some body as a nucleus. This may consist of mucus, fibrine, blood-clot, or even of a crystal deposited from oversaturated urine.

Causes.—They are so various that it would be useless to enumerate them. Impaired breathing, whether from weak or diseased lungs, imperfect action of the liver, or impaired functions generally, are among the

prominent causes. Any cause favoring concentration of urine might bring about the formation of calculi.

How to know it.—Cistus calculus, or stone in the bladder, occurs in all domestic animals, producing straining in the effort to pass the urine. It will escape in driblets, often drop by drop, or not at all. Blood will often be passed in clots, and crystals of microscopic calculi will be passed. By introducing the oiled hand into the rectum up to the bladder the stone may be felt. Sometimes there are a number of them.

What to do.—In the case of a female the stone may be broken with a lithatrite. In the case of a male the operation is called lithotomy. The male is operated on standing, or else thrown on the right side. The operation must in any event be performed by a competent surgeon, since it involves cutting and the use of instruments that may not be attempted by the novice.

Preventive Measures.—The seed of Jamestown weed, or thorn apple (*Datura stramonium*) has been given with good effect in preventing the formation of large calculi. Give an ounce of the powdered seed in the feed every other day until six doses are given. In connection with this give the following:

No. 129.
1 Ounce oil of juniper,
1 Ounce oil of sassafras,
4 Ounces sweet spirits of niter.

Form into four doses and give one morning and night for two days. Animals predisposed to gravel should be fed on sound hay from old meadows, sound grain, and watered only with soft water.

IX. Suppression of Urine.

Causes.—Retention or suppression of urine is due to so many causes, especially in old horses, as paralysis of the bladder, meningitis, lockjaw, severe colic or other acute disease, or from irritating drugs given by ignorant stablemen, that the operator must be informed as to the nature of the case.

What to do—If it be caused by paralysis the urine must be drawn off several times a day with a catheter. The following will be indicated to be given internally:

No. 130.
½ Drachm extract nux vomica,
1 Pint water.

Give as a drench twice a day.

Another remedy, if one has a hypodermic syringe, would be:

No. 131. 4 Drops sulphuric acid,
2 Grains strychnine,
½ Ounce alcohol.

Throw one-half of one grain twice daily under the skin.

If the difficulty is due to general weakness of the bladder, give the following stimulant:

No. 132. 20 Grains powdered cantharides,
1 Drachm powdered digitalis.

Make into a ball with soap.

If there is an accumulation of hard fæces in the rectum it must be removed by full injections of strong soap suds, and if necessary removal of the partially softened dung with the oiled hand.

If there is inflammation of the neck of the bladder, as shown by heat, swelling, tenderness, give injections of one drachm extract of belladonna in a quart of warm water, thrown repeatedly into the rectum of horses and into the vagina of mares. To relieve pain give from one-half to two drachms of opium as may be needed.

X. Inflammation of the Bladder.

Causes.—A disease very rare in animals, and when occurring the effect of violent external injury, or the result of irritating medicines, as croton oil, cantharides, administered by the ignorant. It is quite rare, and may be known by the frequent passing of urine, with great pain and difficulty. As a sure test grasp the horse by the mane half way between the head and shoulder with the left hand; place the right hand under the flank when all nervousness is passed, press more or less strongly on the abdomen. If inflammation be present the animal evinces intense pain. If the muscles be tense and hard there is no inflammation.

What to do.—Give full doses of opium, two drachms, to relieve pain. Give linseed tea, milk, and white of eggs beaten up with water as drinks. As a laxative to relieve the bowels give one to two pints of olive oil as may be needed. Inject into the bladder the following if you have an instrument:

No. 133. 1 Drachm opium,
1 Drachm gum arabic,
1 Pint blood warm water.

In severe cases the ammoniacal blister may be applied, as given on the next page, if there is paralysis of the parts, with or without

fomentations. The acute symptoms having subsided, give small doses of copaiva, one to two drachms, or buchu, two to three drachms, as may seem to be needed. Give soft or sloppy diet, with linseed tea, slippery elm, gum arabic, or other mucilaginous drinks.

APPLICATION OF AN AMMONIACAL BLISTER.

XI. Foul Sheath.

A horse with a foul sheath is unfortunate in his master, unless the difficulty occurred before purchase.

What to do.—Clean the sheath of all foul matter with warm soap suds, removing all lumps. To wash the sheath, take hold of the yard when protruded, and without undue violence hold it with gentle pulling until there be no resistance when it may be pulled out its entire length. When washed, oil thoroughly with lard and salt, three parts of lard to one of salt. Every other day or every three days wash again and oil until a cure is effected.

XII. Rupture of the Bladder.

This difficulty occurs only in the female, the result of difficult parturition. The animal strains violently, and on examination a red, tumid, rounded mass is shown between the lips of the vulva.

What to do.—Wash the parts carefully with tepid water, in which an ounce of laudanum has been mixed with each quart. Then return carefully, by pressing the center of the mass inwards to correct the eversion. The difficulty will be in returning it through the neck of the bladder. There will be more or less inflammation and softening, therefore care, judgment and time must be used, not to tear the tissues. If there is renewed straining, place a truss or compress over the vagina.

XIII. Stricture of the Urethra.

Stricture of the urethra is the result of local irritation, the results of gravel, or of strong astringent injections. The symptoms are difficult urination, with great pain and frequent erections. The cure must be effected by the use of catheters, gradually increasing them in size until the normal condition is regained.

XIV. Inflammation of the Organs of Generation.

a.—In stallions, there is occasionally inflammation of the testicles, caused by external injury and other causes. It may be known by the swelling of the parts, a straddling gait, with drawing up and again letting down of the testicles.

What to do.—Give a purgative, 4 drachms aloes in 1 1-2 pints water. Foment the parts twice a day with warm water. Then dry and apply extract of belladonna or laudanum. If pus (matter) should form, known by fluctuation of the parts, open at the soft part. If the gland is involved, and there is threatened destruction of the part, castration had better be performed.

b.—Inflammation of the Womb.

Causes.—Bruises or other injuries at the time of giving birth, or in getting rid of the afterbirth; retained afterbirth, or exposure to wet or cold after parturition.

How to know it.—Two, three or four days after parturition, there will be an attack of shivering; pains, with looking at the flanks, similar to those in colic; shifting of the hind feet; the loins and abdomen tender, with aching of the loins; the vulva red and swollen; there is frequent straining with fetid discharge. The oiled hand being introduced into the womb, the neck and body will be found filled with fluid; the belly will be tense and swollen; the respiration and pulse will be increased, and the temperature of the body hot. There will be grinding of the teeth, great thirst and loss of power in the limbs.

What to do.—After having drawn out the contents of the womb with a catheter, fill it again with tepid water, introduced through the tube, and wash out thoroughly. Then inject one drachm permanganate of potassa in a pint of lukewarm water, adding four ounces of glycerine and half an ounce of laudanum. Give a purgative dose to move the bowels freely, 4 drachms Barbadoes aloes for a mare; (for a cow, 1 pound of glauber salts). Follow this with 20 drops tincture of aconite four times a day for the mare; (for a cow, 30 drops). Give also once a day 5 drachms

nitrate of potassa, and also once a day 1 to 2 drachms chlorate of potassa. Apply a blister of mustard to the right flank of the mare, or for a cow, mustard and oil of turpentine. If there is a weak pulse, prostration and stupor, use stimulants; quinine in 15 to 20 grain doses, camphor and whisky; also antiseptics, chlorate of potassa, 1-drachm doses, or carbolic acid 1-2 drachm doses in a pint of water.

c.—Leucorrhœa, Catarrh of the Womb or Vagina.

The same general treatment is to be observed as in the foregoing. It may be known by a whitish discharge from the vulva if caused by retained afterbirth. Repeat the injection recommended for inflammation of the womb, daily, and keep up the system with tonics and good food. The following will form a good tonic:

No. 134

2 Drachms sulphate of iron,
1 Drachm black pepper,
½ Ounce ginger,
½ Ounce gentian.
Divide into three doses for each day.

CHAPTER VIII.

DISEASES OF THE TEETH AND MOUTH.

I. TEETHING, OR DENTITION. — II. SHEDDING TEETH. — III. BLIND TEETH. — IV. DECAY OF THE TEETH. — V. SCURVY. — VI. STUMP SUCKING, OR CRIB BITING. — VII. LAMPAS. — VIII. INFLAMMATION IN AND AROUND THE MOUTH. — IX. SLAVERING. — X. INFLAMMATION OF THE TONGUE. — XI. SHARP AND PROJECTING TEETH. — XII. SCALD MOUTH. — XIII. APTHA. — XIV. INFLAMMATION OF THE PAROTID GLAND. — XV. FISTULA OF THE PAROTID DUCT.

I. Teething, or Dentition.

Dentition in the horse has already been written of and illustrated in the map given in this work. In teething, all animals suffer more or less from irritation and fever of the parts, probably as much so as the human family. In puppies and in kittens it often causes convulsions between the third and sixth month. Cattle are principally troubled between the second and third year, and horses from the third to the fourth year, since in the third year they cut four front teeth and eight back ones, and in the fourth year four front back teeth, eight back teeth and the four tushes. Hence the reason why it is advised that at this period of their lives they be not hard worked.

In both cattle and horses the rising teeth are sometimes entangled with the teeth that are being shed. There will be redness, swelling, tenderness of the gums, and the inflammation sometimes extends to the throat, causing coughing and general fever.

What to do.—If there is slavering; if the animal seems to chew hard food with pain, or bolts soft food with haste, examine the mouth. Extract the loose teeth: lance the gums to allow easy dentition; wash the gums with tincture of myrrh: relieve the bowels if necessary with gentle

laxatives, and give as much rest and soft food as possible. Swine from the sixth to the twelfth month usually cut thirty-six teeth, and sometimes require attention.

II. Shedding Teeth.

In the shedding of the teeth the mouth should be examined frequently for loosened teeth, to find if the new teeth are growing properly. If they are likely to become crowded, causing twisting, they should be straightened, and if necessary one of them extracted to allow them to grow properly. Sometimes there will be disease of the membranes surrounding the roots of the teeth, causing loosening, deviation from the proper course, suppuration, and even shedding of the teeth with much pain, even to inflammation and other diseases of the gum. Relief is to be given by careful examination, keeping the bowels open with soft food, such manipulation as may be necessary, sponging the gums with tincture of myrrh, lancing the gums, and extraction of the loose teeth when necessary.

III. Blind Teeth.

Supernumerary teeth may occur among the nippers and grinders. When so they should be extracted. Blind, or wolf teeth, are not supernumerary, but natural as they are insignificant, and would not be necessary to notice here were it not from the fact that ignorant pretenders have given the impression that they are the cause of blindness, big head, and even apoplexy or staggers. These teeth are certainly useless, and occur in horses (not in mares) immediately in front of the grinders and may be extracted without difficulty or injury, care being taken that they be not broken and thus irritate the gums.

IV. Decay of the Teeth.

The teeth of horses under an artificial system of management, are quite subject to decay. Usually this is found in the grinders, although it sometimes, but rarely, occurs in the nippers.

Causes.—Anything that will destroy the enamel or corrode the teeth, strong mineral medicines, fermentation in the stomach, breaking of the teeth by biting hard substances, or natural causes from increasing age.

How to know it.—The horse will suddenly drop the food from the mouth; slavering and exhibition of pain. This means toothache in its acute form. The general symptoms are imperfect chewing of the food,

and consequent finding of whole grain in the dung; indigestion, unthrifty state of the hair and skin, irritability, loss of condition, generally with swelling of the legs; swelling of the jaw-bone about the carious tooth, quidding of the partially chewed hay, accumulation of food around the tooth, and between it and the cheek.

A HORSE WITH TOOTHACHE.

What to do.— Put a balling iron in the horse's mouth, and examine the jaws for broken or decayed teeth. If suspected, tap it gently. If there is inflammation, lance the affected parts, and sponge with tincture of myrrh. If the tooth is ulcerated, it is better to extract it at once; if not, it may be cleaned and the cavity filled with gutta-percha. If tender from exposure of the nerve, it must be relieved or deadened with crystalized carbolic acid and powdered opium, before filling. As a rule, in extensive caries, the tooth may be extracted. If so, the opposing tooth must be occasionally rasped down. The extracting of teeth, however, should only be undertaken by a veterinary surgeon, except in the case of loose teeth, which may be extracted with a large pair of forceps.

V. Scurvy of the Teeth.

Old horses are subject to deposit of calcareous matter, by which the teeth become ridged with a white scurf, extending down upon the gums, inflaming them and keeping them sore. This is generally confined to the front teeth. Young horses also sometimes suffer from this disability.

Causes.—Imperfect digestion and sour stomach, evolving gases, or any cause injuring the enamel of the teeth.

What to do.—First, find if his system is in good condition, or put it so. Put a twitch on the animal's nose and with proper instruments remove the incrustations. Files, scrapers and fine emery paper are the means to be used, the teeth afterwards to be oiled. In ordinary cases, a stiff brush and a mixture of tartaric acid and salt will do it; rubbing afterwards with clean, hard wood ashes. Keep hard wood ashes and salt where the horse may take it at will.

VI. Stump Sucking, or Crib Biting.

Stump sucking is when a horse rests its teeth against any projection, arches its neck with spasmodic action of the throat, chest and flanks. Crib-biting is when the horse seizes the crib or other hard substance be-

tween the teeth and pulls, with or without spasmodic action. Wind sucking is when the horse suddenly seizes any hard, firm substance with its teeth, pulls back, sucking in the air, sometimes with so loud a spasmodic action, noise and groans that it may be heard for a long distance, with swallowing and eructation.

What to do. — It is probably more generally connected with disease of the teeth than is generally suspected, and these should be immediately examined for cause. At length it becomes a confirmed vice. Relieve any disabilities from the teeth. The remedy is to allow no surface uncovered with sheet-iron where the horse may reach it. Smearing the front of the manger with aloes has been recommended. A muzzle with two iron bars projecting from the lower jaw over the mouth and extending over and between the nostrils, will prevent the vice. If the disease be pure wind-sucking, a strap fastened tightly about the upper part of the neck will prevent the effort, but there is danger of the horse becoming a roarer.

VII. Lampas.

Lampas is congestion of the palate; a redness and swollen condition of the bars of the mouth behind the upper front teeth, caused by dentition in young animals, and in old ones from indigestion, causing pain in chewing from the protrusion of the tender parts.

What to do.—If in young horses, the means advised in dentition, with slight cutting (scarifying) of the roof of the mouth, with a sharp knife or lancet will suffice. In old horses, scarification, with a general attention to the health of the animal will be indicated. In scarifying, cut only about an inch back of the teeth, and never deep. Just behind the third bar an artery lies near the surface, difficult to manage if cut through. Hence the care required in bleeding in the roof of the mouth. Should, by accident the artery be severed, put a strong cord around the upper front teeth close to the gums, and strain it as tightly as possible. This will generally close the orifice and stop the bleeding. As a wash for the gums, the following will be good:

BURNING FOR LAMPAS.

No. 135. 1 Oz. chlorate of potash,
2 Ozs. soft water.

Never burn the bars of the mouth for lampas. It is as senseless as it

is brutal and cruel. Never use *caustics*. The bars of the mouth are useful to the horse, as the palate is to man, and may not be tampered with with impunity.

VIII. Inflammation in and Around the Mouth.

Causes.—Irritation from wounds, bruises, acrid or poisonous plants, savage bits, injuries from the bit, twitch or rope around the under jaw and tongue, medical irritants, bites or stings of reptiles or insects, the use of calomel and other salivating drugs, fungus growths, specific fevers, etc.

How to know it.—There will be difficulty in feeding and drinking, slavering with or without fetid saliva, swelling and rigidity of the lips, cheeks or between the bones of the lower jaw, blisters or sores within the mouth, swelling of the glands, etc.

What to do.—Find the cause, whether from mechanical injury, irritating food or irritant drugs. If injured by alkalies wash with vinegar and water, equal parts; if by acids use lime water or a weak solution of bicarbonate of soda; if caused by caustic salts use mucilage of slippery elm, or white of egg; if from venomous bites apply ammonia and give one-half ounce of liquid ammonia internally to the horse, and one-half to one ounce to the ox. For bite of venomous snakes, tarantula, etc., cauterize the wound in addition and give whisky in full doses. If there is simple inflammation, open the bowels with a gentle laxative, two ounce doses of magnesia, and wash with vinegar and honey. Give plenty of cool water and soft food. If there are ulcers, touch them with a feather dipped in

No. 136. 10 Grains lunar caustic,
1 Ounce rain water.

If there is much swelling keep the head tied up. If tumors resolving into matter (pus) appear, open with a lancet or knife. If there is sloughing of the parts (separation of dead flesh) wash with the following:

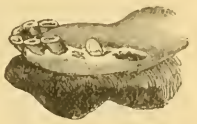
No. 137. 1 Drachm permanganate of potassa,
1 Pint of water.

IX. Slavering.

Causes.—The result of mercurial salivation, symptoms of various affections, as apthous fevers, epilepsy, cutting teeth, ulcers of the mouth, irritating food, alkalies, acids, bad fodder, etc. White clover will often cause undue secretion of saliva by the glands.

It may be known by the free discharge of saliva, great thirst and often indigestion.

What to do.—Find the cause and remove it. Give cold water to drink, and sound grain, grass and hay. Use as washes for the mouth, vinegar and water or vinegar and honey. If the saliva is offensive, use water slightly tinctured with carbolic acid as a wash, and attend to the general health of the animal.



EFFECT OF CRUEL USE OF THE BIT.

X. Inflammation of the Tongue.

How to know it.—There will be difficulty in eating and drinking. The tongue will be swollen and inflamed, sometimes hanging from the mouth.

What to do.—Use the same means recommended for inflammation of the mouth, first having thoroughly searched for wounds from any sharp substance having punctured and remained in the tongue. If the tongue hangs from the mouth put the end in a bag, and support it with tapes extending from the corners of the mouth and tied behind the ears.

XI. Sharp and Projecting Teeth.

The remedy for this disability will be obvious. Secure the animal, put a twitch on its nose, if a horse, and a balling iron in the mouth and file the teeth until smooth and even, using a rasp made for this purpose, flat and with a slightly crooked handle.

XII. Scald Mouth.

Causes.—The ignorant use of acid drenches or corrosive drugs by careless or ignorant stable men. Medicines of unusual strength are sometimes sent with directions for diluting. If labels were carefully read, and directions implicitly followed, there would be less of this distressing malady, often ending in chronic disease of the stomach.

How to know it.—The mouth is red, often raw; the lips are in constant motion, moving up and down; the saliva flows continually, showing the pain the animal endures.

What to do.—Give well-made cold gruel, either of corn or oatmeal, and soft food if the horse can take it. Boiled carrots are excellent if the animal will eat them. Prepare the following lotion:

No. 138. 5 Ounces of powdered borax,
2 Pounds of honey,
1 Gallon of boiling water.

Mix, let it become quite cold; hold up the horse's head moderately and pour half a pint into the mouth. At the expiration of half a minute allow the head to gradually drop so the fluid may flow over the inflamed surfaces. This should be repeated several times a day. Beyond this nothing can be done except to attend to the general health of the animal, which should do no work until entirely recovered.

XIII. Aptha, or Thrush.

A disease incident to sucking animals and young horses, generally occurring in the Spring and Fall.

How to know it.—Red patches will appear on tongue, cheeks and lips, which assume a whitish color, caused by a fungus growth (*oedium albicans*). The lips swell; the tongue hangs out of the mouth; vesicles form containing a clear, gelatinous fluid. At length these burst; crusts form and recovery ensues.

APTHA.

What to do.—Give the animal soft food as recommended for other mouth diseases. Wash the mouth with the lotion prescribed for scald mouth, or prepare equal parts of honey and powdered bayberry bark into a paste, with which anoint the affected parts every night. To purify the blood and promote the general health give the following:

No. 139. 1 Ounce flowers of sulphur,
1 Ounce powdered sassafras bark,
2 Ounces powdered golden seal.

Mix, divide into four portions and give one every night in scalded shorts allowing it to get cold. Or give it in cold gruel as a drink. This prescription will be found valuable in any case and for all farm stock when the blood is thick and inclined to humors. Give fully grown swine half the dose prescribed, and full grown sheep one-third the dose; that is, divide into eight doses for swine and twelve for sheep.

XIV. Inflammation of the Parotid Gland.

Causes.—This gland, which lies in the hollow that extends from the root of the ear to the angle of the lower jaw, sympathizes with inflammation of the upper part of the throat, and becomes hot, tender and swollen in almost ever case of cold. It is liable to inflammation also

from mechanical injury, and from obstruction of its duct. In bad cases of strangles or distemper, it will sometimes swell to great size and will break, a fistulous sore being the termination.

How to know it. — When the gland has become swollen, it is easily discernible by sight or feeling. There is a hard and painful lump beneath the ear, with a softer feeling about its edges. The horse carries his head stiffly, chews slowly and with difficulty, and has some general fever.

What to do.—As this state of the gland is almost always preceded by cold, and is accompanied by it, the treatment must be first directed to the removal of the exciting cause. Place the animal in comfortable surroundings, attend to the state of his bowels, giving 3 ounces glaubers or epsom salts, in case of constipation, and a few warm mashes. Meanwhile, cover the affected gland with a good poultice until the inflammation is subdued.

If inflammation results from mechanical obstruction, that obstruction must of course be removed before any permanent relief can be obtained; and this may require the removal of a calculus or stone from the parotid duct, which can be safely done only by an experienced surgeon.

If attention is not directed to the swelling until matter is forming, allow it to approach the surface and come to a head before attempting to open, to avoid cutting any of the ducts, which might result in a fistula. If the tumor becomes hard, use iodine, almost to the extent of blistering.

Any wound inflicted mechanically, as a cut into the gland, or a prick with a stable-fork, must be treated externally according to its nature—the main point being to close it so effectually that the salivary fluid which it is the office of this gland to secrete cannot escape through the wound.

XV. Fistula of the Parotid Duct.

Causes.—The parotid duct, which is formed by a union of the smaller ducts of the parotid gland, enters the mouth after it leaves the gland, in front of the large masseter muscle of the cheeks—having passed for some distance upon the inner side of the jaw, and then turned under the lower border of the bone. The saliva secreted by the parotid gland, which lies at the spot where the neck joins the jaw, is poured into the mouth by this parotid duct, to be mingled with the food during the process of mastication. If the mouth of this little tube is closed in any way, so as to prevent the free egress of the saliva, distension of the duct takes place, and the confined secretion causes suffering, inflammation, and finally rupture. This stoppage is sometimes caused by hayseeds or other particles of food that enter the mouth of the channel while the

animal is feeding. The presence of food in the mouth and the motion of the jaw stimulate the action of the gland, and since the saliva thus secreted cannot escape by its natural opening, there is constantly more and more pressure until some outlet is found. This, as we have said, may be by bursting, or it may be by external accident. A wound inflicted on the jaw with any pointed instrument, as a hay-fork, has been known to penetrate this channel. The saliva thereupon pours through the opening, and by its constant flow it prevents the healing of the wound, so that its edges speedily become hard and without that liveliness essential to the closing of punctured or gashed flesh.

The stopping of this passage into the mouth is said to have been sometimes caused by calculus or stone in the cheeks of the animal. These, of a size exceedingly large in proportion to the size of the duct in which they lodge, have been taken from the jaw.

Every wound which penetrates this or any other duct of the salivary glands soon becomes a fistulous and offensive sore; the fluid secreted by the gland finds its way out through the false opening, while none of it enters the mouth to perform its natural function in preparing the food for the stomach, so that the horse soon begins to lose flesh, and finally assumes a wretched and loathsome appearance.

The opening of the parotid duct occasionally occurs, perhaps, from the opening of abscesses attending strangles or distemper.

How to know it.—The digestion necessarily becomes deranged when the process of mastication is carried on for any considerable length of time without the foods being moistened by that secretion which the parotid duct in a healthy condition furnishes; but the orifice in the skin under the jaw or on the cheek at the large muscle, discharging a liquid somewhat resembling the white of an egg, is the unmistakable indication of the disorder under consideration. During the act of feeding this fluid is freely discharged, even sometimes squirting from the wound, and especially so if the food is dry and hard to chew. It will be noticed that in chewing the horse uses the opposite side of the mouth from that on which the opening occurs, and that the process is slow and difficult. The edges of the wound soon become callous, the running of the stream down the cheek destroys the hair, and the whole part has a fistulous and filthy appearance.

What to do.—In the first place, especial care must be taken to keep the animal, during the period required for effecting a cure, upon food that requires no chewing. It should be sufficiently plentiful and nutritious to prevent the uneasiness of hunger. Soft mashes and gruels alone should constitute the diet. Another precaution is necessary when he is

left to himself—that is, to tie him up in such a way as to prevent him from rubbing the wound. This can be done by having a rein at each side of the halter, and tying it up, one to each side of the stall, and sufficiently back and high up to keep him from putting his jaw against either the trough or the wall against which it stands.

If the wound has recently broken, shave the edges so as to remove all roughness and bring them closely and evenly together. Then cover with collodion, putting on coat after coat until it is strong enough to keep the wound from bursting.

If the sore is of long standing, and the case evidently obstinate, the first care must be to determine whether the channel has become closed between the wound and the mouth, as sometimes happens. If so, make a new one and keep it open by passing a thread through it. This thread must have a flat button affixed to each end, one inside the mouth the other outside the wound, to retain it in place. It should not be so closely shortened by the buttons as to prevent its being slipped a little, first one way then the other, until the walls of its passage have become callous or firm, and not likely to adhere. It must then be withdrawn, and the way being open for the secretion to escape into the mouth the outside wound must be closed. To do this, make an adhesive fluid by saturating gum mastic with the strongest spirit of wine, or by dissolving India rubber in sulphuric ether. Pare off the edges of the wound till the healthy skin and flesh are laid bare, which may be known by bleeding. Now wash the surrounding parts thoroughly with warm soap suds, so as to remove the oily secretion from the skin and hair, and render the latter dry, so that an adhesive preparation may the more readily stick. When the bleeding has stopped and the hair is dry, lay over the orifice a piece of India rubber, and over that a cotton cloth. Fix the cotton firmly by means of the adhesive fluid above mentioned, first attaching one side, then, when that is dry and firmly fixed, stretching and fastening down the other edge. Continue to fasten on these strips one after another in this way—some of them cross-ways—until there is a good body of them; then thoroughly saturate the whole with the adhesive fluid and tie up the animal as already directed. When his reins are loosened in order that he may eat, he must be watched to see that he does not rub and re-open the wound.

This one covering, as described, is generally sufficient to effect a cure; but if it falls off before the orifice is entirely closed, wait a day or two, still feeding on soft food, and then put on another coat of the India rubber, cotton, and mastic solution; and so continue until a cure is effected.

CHAPTER IX.

DISEASES OF THE HEART, BLOOD, ETC.

I. THUMPS. —II. SCROFULA.— III. FEVER, OR GENERAL INFLAMMATION.—IV. ENLARGEMENT OF THE HEART. — V. FATTY DEGENERATION OF THE HEART. — VI. ENLARGEMENT OF THE ARTERIES. —VII. INFLAMMATION OF THE JUGULAR VEIN.—VIII. INFLAMMATION OF THE ABSORBENTS.—IX. SCARLATINA.

I. Thumps.

Palpitation of the heart, or thumps, as it is usually called, may occur from fright, in highly fed, irregularly worked animals, but is not as a rule connected with structural disease of the heart.

Causes.—Indigestion, some blood diseases, sudden excitement or fright in animals predisposed to nervousness.

How to know it.—The action of the heart will be violent and convulsive; the beatings can be seen, felt and heard. The disorder comes on abruptly, generally from excitement, has perfect intermissions with abrupt jarring thumps, and a jerking motion of the abdomen, and unaccompanied by redness of the mucus membranes; excited eyes, rapid breathing and a more or less sudden diminution of the palpitation. If signs of temporary excitement are not present; if the attack comes on slowly, is constant with aggravated intervals; if there is a heavy, prolonged, unequal beating, with red mucus membranes and swelling of the limbs, it may be inferred that the difficulty is connected with structural heart disease.

What to do.—Avoid sudden excitement and over-exertion, but give regular but gentle exercise, stimulants and tonics. The following would be indicated as a stimulant, either whisky, or 1-2 ounce liquid ammonia. Give 15 to 20 grains digitalis twice a day in the feed, for some weeks.

If there is a full, strong pulse, and increased size of the heart, add to the digitalis 20 drops tincture of aconite, twice a day, or drop it into the water given twice a day. If there is general debility, the following will be indicated, to be given twice a day for several weeks:

No. 140 ½ Drachm powdered nux vomica,
1 Drachm extract of belladonna.

Form into a ball with liquorice powder and molasses, and give.

II. Scrofula.

The horse is not subject to scrofula, as is man, and the lower farm animals. Swine are essentially scrofulous; sheep are often so; cattle more rarely, and horses least of all. Yet that this noble animal has the germs of this dread disease in his system, would seem to be indicated by ulcers on the liver, tumors in the glands, and tubercles of the lungs. Thus it may be found in connection with other diseases, or show itself in eruptive skin, or of the organs.

What to do.—Stramonium, known to farmers as Jamestown or Jimson weed, is a specific. Give every other day half an ounce of the dried seed, bruised, or 20 to 30 grains of the stramonium of the druggists, daily. The ox may have from 1-2 to 1 drachm; sheep 5 to 10 grains, and swine 4 to 6 grains daily, the state of the bowels being carefully attended to by giving laxative food if costive, or if necessity occur, medicine, Glauber salts in light doses.

III. Fever, or General Inflammation.

When from any cause injury is done to any part of the frame, or inflammatory action is set up either in the tissues, membranes, or any of the organs of the body, heat is produced, and this is fever. This often becomes general from sympathy, thus in a measure relieving the pressure on the more closely affected parts. Fever is not the disease itself, but the result of disorganization, a symptom of disease, or internal disorder. In fact, a symptom of disease arising from sympathy of the system with disease of the animal economy. Remove the cause and the fever will cease. We may do something to alleviate it in connection with the treatment of the disease itself, but we must not lose sight of the latter.

In intermittent fevers there is a cold stage, a hot stage and a sweating stage. These may vary in succession and degree, but the real difficulty is in a morbid state of the viscera, but particularly of the liver and organs employed in the formation of bile, and of the mesentery. In fevers the tongue is coated. Yet no quack is so ignorant as to suppose

the fever can be cured by scraping the tongue, and yet this is fully as sensible as to suppose fever to be the disease itself when it is an effect of disease.

In the horse fevers often manifest themselves through inflammation of the mucous or serous membranes, producing catarrh or influenza. When it affects the mucous surface of the stomach and bowels it produces extreme languor and debility. In pleurisy there is inflammation of the serous membranes within the thorax. The fever is the manifestation of the disease. In typhoid fever there is inflammation of the brain and viscera and especially of the stomach, intestines and peyers gland. The fever is the attendant simply upon the cause of the inflammation.

Fever in horses has been described by the author of Hippopathology to be 1st. Common fever—a general diffuse inflammation. 2d. Idiopathic—arising without any apparent local injury. 3d. Symptomatic—arising from some local cause or irritation. The late Dr. Dadd, V.S., very truly says:

"A rational system of veterinary medicine contemplates, in the treatment of febrile symptoms, nothing more than a kind of expectancy. If the patient be in the cold stage, administer warm diffusible stimulants and diaphoretics, aided by warmth and moisture externally; friction on the extremities, and, if necessary, stimulating applications to the chest and the extremities. In the hot stage, and when the superficial heat of the body is great, cooling drinks are indicated; water acidulated with cream of tartar, makes a good febrifuge. The patient may be occasionally sponged with weak saleratus water. The alkali has a beneficial effect on the cutaneous vessels, while the water lessens the temperature of the body. No treatment, however, can be of any rational use, unless it contemplates a restoration of the healthy equilibrium of the whole system. Let the doctor treat the disease, and a good, attentive groom can manage the fever."

In treating general fever or inflammation, therefore, we must first find the cause, and treat, giving such agents as have been indicated throughout this work, for the febrile symptoms as they occur. As a rule we do not advocate bleeding, but in the horse in the early stages of acute inflammation, especially of the brain, and all that class of diseases which involve the general system, and when the blood is thick and dark, sometimes almost brown, bleeding may be practiced with success. It is never well however to bleed blindly. In apoplexy and that class of diseases, bleed. It is a case of life or death. For fevers in general there can be no specific. In diseases of the blood, accompanied by fever, alteratives will be indicated both as a preventive and corrective of the diseased functions. Sometimes the condition of the absorbents are so inactive that alteratives

cannot act. Here bleeding would seem to be indicated. Yet it is better unless in the case of life or death, that it be not resorted to, except under the advice of a competent veterinarian or physician.

IV. Enlargement of the Heart.

Hypertrophy or enlargement of the heart is an increase of its muscular substance and may be confined to one side or one ventricle. Sometimes disease of the valves leads to enlargement much beyond its usual size. Enlargement of the heart also accompanies broken wind and other impediments to the free action of the lungs and breathing tubes.

Causes.—Long continued hard work; chronic indigestion, or some obstruction to the circulation.

How to know it.—There is palpitation, the beats forcible and prolonged, the intervals of silence shortened. The first sound is low, muffled and prolonged, the second loud, and if only one ventricle is affected sometimes repeated. The pulse is as a rule regular, except under excitement of the animal, and, the excitement removed, soon returns to its usual state. The breathing is often hurried, and exertion increases the general symptoms in a marked manner.

What to do.—Simple hypertrophy is seldom the cause of imminent danger. It is not unusual for horses with an enlargement of the heart to do steady, slow, moderate work, and live to be old. If there is dilatation, weakness, blowing murmurs with the first heart sound, spells of oppressed and difficult breathing, if the nasal and other visible mucous membranes are livid, there is danger of sudden death at any time.

Keep the animal quiet, and at only slow, moderate labor; never overload or put him to speed. Let the diet be of good, easily digested food; never allow the stomach to become overloaded. Give twice a day from 20 to 30 drops tincture of aconite root as the case may need. If there is broken wind or other serious impediment to breathing, 3 to 4 grains of arsenic in the food has been found useful. If the case, however, be of long standing, or due to permanent obstruction, treatment must be simply alleviation. The case will eventually end in death.

V. Fatty Degeneration of the Heart.

This disease is occasioned by a change of the muscular substance of the heart to a fatty state, by which the organ is weakened, at length leading to rupture of its tissues. It is not uncommon in high-bred stock, including cattle and swine.

Causes.—High feeding, inactivity, want of exercise, and the result of such diseases as purpura scarlet fever, and diseases the result of profound alteration of the blood.

How to know it.—Debility in the circulation, irregularity and weakness in the pulse, lessening of the heart sounds, swelling of the legs and sometimes a general dropsical condition, dilatation, a want of correspondence between the heart beats and the stroke of the pulse, appetite irregular and capricious, and the membranes of the mouth and nose a rusty red color.

What to do.—Humor the appetite with sound, easily digestible food. There is no remedy. Attention to the general health, and an ounce of chlorate of potash twice a day in the food may mitigate symptoms when more violent than usual. In all heart or arterial diseases give rest, and in fattening stock, do so as quickly as possible.

VI. Enlargement of the Arteries.

Dilatation of the arteries (Aneurism), is rarely found. It is a thinning and weakening of the coats of the vessels, sometimes to bursting, causing a pulsating tumor containing blood.

Causes.—Severe strains in the vicinity of an artery, blows, kicks, stabs, or weakening from overstretching, as in fatty degeneration. In the mesenteric arteries of horses, they are common from immature worms (*Sclerostomum equinum*) in the circulation.

How to know it.—There is a soft, fluctuating, visible tumor if near the surface, which may be reduced by pressure, but which instantly reappears.

What to do.—Treatment is not successful except when near the surface. Then steady pressure by a pad if taken early will sometimes cause its disappearance. An animal with enlargement of the arteries is unsound and should never be bought. The same rule applies to all diseases of the heart.

VII. Inflamed Jugular Vein.

Causes.—This is due, for the most part, to bleeding, and the treatment to which the horse is subjected, or rather lack of treatment immediately after blood-letting. It is not to be attributed to any particular manner of bleeding, or to any awkwardness in its execution and in the closing of the wound. Some horses have a constitutional predisposition to inflammation upon any occasion of punctured veins, and the most skillful phlebotomist cannot avoid throwing them into this state unless care is taken

after the operation to see that there is as little exciting cause as possible. Inflammation may, indeed, result from bruising the vein in the act of bleeding, but this must be of so rare occurrence as to be scarcely worthy of notice. The same may be said of a large and ragged wound made by a bungling operator.

The motion of the animal after bleeding, and rubbing so as to displace the pin and tow by which the wound is usually closed, may be set down as the great sources of danger. If the horse is turned loose and allowed to graze about, hanging down his head and keeping it down at will, with his jaws in almost constant motion, inflammation of the vein is apt to result. So, if he is allowed access to food in a trough or stable. When allowed his freedom he is apt to rub the wound whenever itching sensations supervene, as they are apt to, and the trouble is thus easily induced. If put to the saddle immediately after blood-letting from the neck, the bridle reins may rub the wound, and especially irritate it by disturbing its fastenings; and if put to harness the collar may press the blood too violently and constantly against the orifice, and so bring on inflammation.

How to know it.—The earliest indication is a slight opening of the lips of the wound, whence exudes in small quantity a thin, watery discharge. A slight swelling appears; this is followed by a hard, cord-like enlargement of the vein, which feels hot; and there is some visible swelling at the angle of the jaw. The swelling takes place above the orifice, and the inflammation tends almost wholly in that direction.

If neglected, the second stage of the disorder soon sets in. Abscesses form along the vein, and these finally burst and discharge a thin but filthy pus. These tumors are united at their bases by sinuses in the interior of the vessel.

It may be reckoned as a third stage of the disease when the vein feels hard under the skin, and the abscesses discharge a dark, impure and stinking pus, resembling rotten blood. At this stage the horse grows dull and stupid; then at last the inflammation extends to the brain, and a madness similar in violence and fatal effects to the rabies may supervene.

What to do.—In the first place, "an ounce of prevention is worth a pound of cure," and whenever it is necessary to bleed an animal, let it be done in as neat, skillful and expeditious manner as possible; then close the wound with care, leaving no part of the fastening pin to project over the suture or winding of tow or cord by which the lips are drawn close; and at once tie up the horse in a stall. If the stall is contracted in width, it is all the better, as he will be less likely to stir unnecessarily.

Tie the halter above and something back from the manger, so that he cannot rub his neck against the trough nor anything pertaining to that part of his stall. Give him no food that will necessitate chewing—

nothing but a sufficiency of thin, cool gruel, having in it no inflammatory ingredients, to prevent the absolute gnawings of hunger. Water may be given in as great quantities as he will take.

Allow him to remain in this position twenty-four hours. Even then, do not turn him into a field, as the traveling to and fro, with the head often pendent and the jaws in motion as he grazes may yet cause inflammation. He may now, however, be allowed a more roomy stable; but the food should be for another day only such as will necessitate no considerable chewing. This precaution will in all probability wholly prevent inflammation, even in those cases where the animal has a strong constitutional tendency to it.

These directions, however, are not to be understood as applicable to every case. When a horse is bled to relieve some sudden or acute local trouble, there is really but little danger of inflammation of the jugular, especially if the acute trouble is attended with marked local fever.

When inflammation has actually set in, from whatever cause, the cure is easy and speedy, if steps be promptly taken to this end. If begun while in its simplest stage, place the horse at once in a stall, as previously indicated, and tie his head up during the day—giving him food and drink by raising a bucket within easy reach for the time. Then sponge the inflamed part very frequently with the following lotion, as cool as it can easily be made:

No. 141.
3 Ounces tincture of arnica,
2 Ounces muriate of ammonia,
4 Ounces methylated spirits of wine,
3 Pints water.

It will be more effectual if some soft padding is confined along the whole extent of the inflammation, and this kept constantly saturated with the cold lotion.

After the inflammation has subsided, mix biniodide of mercury and lard in the proportion of 4 drachms biniodide to 4 ounces lard, and rub the vein well with this, if it remains enlarged, every night until the new deposit has been absorbed, which will be known by its having produced a free watery discharge.

The treatment thus laid down is intended to apply strictly to the first stage of the disease. When the second stage has set in before treatment is begun—that is, discharging abscesses along the vein—begin by removing the pin and suture, if not already done, and then blister along the whole extent of the inflamed and tumorous surface by rubbing in effectually the oil of cantharides, or liquid blister. One blister must succeed another till every sign of the disorder has disappeared. If the case seems to be violent and to yield slowly, one blister must not wholly cease to

act until another coating of the oil has been applied—though this is not necessary except in very obstinate cases. If the liquid is to be applied over an old one, still raw, use a fine brush with which to lay it on, and then cover over with an application of some unctuous oil to soothe the severe smart that presently sets in. Be careful always to have the blister cover every spot where there is indication of inflammation.

If the disease has progressed to that stage in which there is a foul and black discharge, the abscesses must all be joined by slitting up the intervening sinuses. Cut the whole extent of the hardened vessel except a little at each end, which must be left to prevent copious bleeding. Employ a small, suitable probe, carefully and patiently, and cut along the track indicated, from abscess to abscess. Then apply the liquid blister as directed, regardless of sores or cuts, and continue to do so until the part is but one blister sore and not a lot of discharging tumors.

The vein will of course be destroyed. Whenever the corded and suppurating state sets in this is inevitable, as no human agency can restore its functions; but this will not seriously interfere with the circulation, since the smaller vessels that ramify every part of the neck (as, indeed, of the whole system) soon accommodate themselves to the new order of things, and the life-current flows regularly on. It requires much time, however, to bring him to that condition in which he will not need more than ordinary attention. Throughout the day his head must be tied up to the rack, while at night he may be loosened so as to permit him to lie down. The floor should be covered with tan, as he would chew straw, and thus render cure more difficult by that motion of the jaws which is to be guarded against. He should be kept this way for from four to seven weeks, according to progress of recovery. Meanwhile his food should be hay tea, sloppy mashes, and cooling gruel moderately thick. No solid food should be allowed—no corn nor oats. Potatoes, carrots, turnips, boiled, reduced to pulp, moistened and mixed with bran.

At the close of the time designated begin regular daily exercise—very little at first, but gradually increasing it, which may be continued for two or three months, during which time he should not wear a collar, or be in any way subjected to pressure about the neck. After three months he may be restored by degrees to the use of solid food; but much care should be observed during a whole year, after which he may be considered measurably sound.

Inflammation may follow bleeding from leg veins, and those elsewhere, but it is most common in the jugular and most troublesome. The treatment prescribed is of course applicable to other veins.

VIII. Inflammation of the Absorbents.

Inflammation of the absorbents (*Lymphangitis*), has a variety of names, among which are Weed, and Shot of Grease, and may be a constitutional case, or a mere local affection. In its constitutional form, it is found in heavy lymphatic, fleshy-legged horses that, hard worked on heavy feed, are left in the stable for days together.

In its local form it is the result of wounds, bruises, injuries of various kinds, putrefying matter in and around the stable. It may occur from the specific poison of glanders, farcy, etc., and in the constitutional form may go on to abscess, sloughing and unhealthy sores, and death; or the horse may be left with the limb permanently thickened. In the local form there may be abscess, diffuse suppuration, induration of the glands, and even the vessels and surrounding parts.

How to know Constitutional Lymphangitis.—There will be more or less shivering; in bad cases severe, quickened breathing; rapid, hard pulse; a general feverish state, and fever in one or both hind limbs. Enlargements may be detected high up in the groin, by the side of the sheath in the horse or udder in the mare, and great tenderness of the inguinal glands. The shivering fits will be succeeded by fever with burning sweats, swelled limbs, exudation and filling, sometimes to the body.

What to do.—In mild cases, give moderate and daily exercise, pay attention to diet, ventilation, and cleanliness. If the case is more severe, give from 4 to 6 drachms of aloes, apply warm fomentations continually to the limb, with walking exercise The bowels having been thoroughly moved, give diuretics, an ounce of saltpeter in a gallon of water two or three times daily; or 10 grains of iodine. In very bad cases, when the subject is plethoric, bleed from the jugular vein until the pulse softens, and proceed as before directed. For "thick leg," a chronic thickening of the limb, bandage from the foot up when the animal is in the stable, and apply tincture of iodine for four days, giving daily exercise; or rub the limb with iodine ointment, and give the following once a day:

No. 142.
½ Ounce powdered resin,
½ Ounce niter,
10 Drops oil of juniper.

Mix into a ball with liquorice powder and molasses.

If abscesses form, open them with a sharp knife, and dress with the following:

No. 143.
1 Ounce carbolic acid,
1 Pint distilled water.

In the local form there will be slight swelling of the cords, and redness in white skins. The lymphatic glands will be enlarged along their course, and become nodular or knotty. There will be pasty swellings of the parts, and even erysipelas.

What to do.—Give rest, and a purge of aloes as recommended for the chronic state. Wash the diseased limb with the following:

No. 144. ½ Drachm opium,
1 Drachm acetate of lead,
1 Drachm carbolic acid,
1 Quart rainwater.

In case of excessive inflammation, poultice with flax seed or bread and milk to hasten suppuration. Open the suppurating parts to let out the matter, and dress with the carbolic solution as in the other form of the disease.

IX. Scarlatina.

Causes.—This disease, called also scarlet fever, is not considered contagious in its milder forms, but in a malignant stage it would doubtless be as much so as the same disease in the human family. It is sometimes regarded as but a mild form of acute anasarca, and not entitled to be treated as a distinct affection; but we cannot dwell upon the niceties of classification, and where the necessities of the case (the knowledge requisite for treating certain manifestations of disease successfully) are met, it is not important that we should.

It generally follows influenza and other affections of the respiratory organs; and may be justly said to have its origin in colds, and in some cases, perhaps, in the breathing of vitiated air in close, dark, ill-ventilated stables.

How to know it.—The patient exhibits great thirst, with a failing appetite, and evident weakness. He is more or less unsteady in his gait; his breath is hot and stinking, and all the limbs are swollen. But the most unmistakable signs are elevated blotches on the skin about the neck and fore limbs, and scarlet spots, of variable size, on the membranes within the nostrils.

What to do. — First, remove the animal from its fellows, for fear the disease may develop into that putrid form which is found so contagious among children, and prove infectious. Give an occasional watery bran mash to keep the bowels open and allay fever. If this is not found sufficiently laxative, give a dose of Epsom salts, or linseed oil. Guard against too active and violent purgatives. Mix three ounces liquor acetate

of ammonia with three ounces of cold water, and drench with this once or twice a day, according to the violence of the fever, for three days. Meanwhile, sponge the elevated spots on the skin with a tincture of muriate of iron mixed with warm water; or, if found more convenient, put two ounces of hartshorn (aqua ammonia) into a quart of soft water, and use that.

There is a tendency in this disease to dropsical effusions, and the limbs become very much swollen, even during the treatment prescribed; and by the third or fourth day a whitish mucus will begin to run slightly from both nostrils; the scarlet spots will have spread and become redder. Give now, night and morning, one-half fluid ounce sweet spirits of niter, for four or five days. Discontinue to sponge the elevated spots, but rub the limbs closely and often; and blanket the animal if necessary to keep him comfortable. The niter acts as a diuretic, and the dose and length of time it is given must be regulated by the effect upon the kidneys. If urine is voided too often and too freely, lessen the dose, or discontinue it altogether. Follow this up with a daily dose of twenty grains of sulphate of quinine for from three to six days, and continue to rub the limbs. When there are signs of returning appetite, give him, in addition to the bran mashes, a few oats and a daily small allowance of hay; and place him in a small inclosure, where he may have such moderate exercise as he may be prompted to take. Do not fail to supply him from the first with all the pure water that he will drink.

CHAPTER X.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

I. HYDROPHOBIA, OR RABIES. —— II. MAD STAGGERS, OR PHRENITIS. —— III. BLIND STAGGERS, MEGRIMS, OR VERTIGO. —— IV. APOPLEXY, OR SLEEPY STAGGERS. —— V. ABCESS WITHIN THE BRAIN.

I. Hydrophobia, or Rabies.

Causes.—This is the name given to a madness which generally arises from the bite of a dog, though wolves, foxes and cats are also subject to it by a spontaneous generation, and this bite is as fatal to another animal and to man as that of the dog. It is believed by some authorities that in rare cases hydrophobia arises spontaneously in the horse; but of this there is no proof; and since it may have been communicated by something of the dog or cat kind, even in those cases where all the outward signs are lacking, it is safe to say that the horse takes it only by inoculation. He need not be absolutely bitten. The licking of bridle-bit sores at the corner of his mouth by a mad dog is sufficient to introduce the poison by absorption; and if the horse by any means chances to take into his mouth and stomach, with his food, the saliva or spittle of a mad animal, he will very probably be attacked, and especially if the animal so dropping the spittle is suffering with the disease in its violent stage. The poison is known to reside in both the spittle and the blood of its victim.

When once the virus has been generated in or communicated to any animal, hot weather, abuse, want of water, want of good food, will produce that feverish state which is so favorable to its development; and the greater or less time in which it manifests itself decidedly in horses after inoculation, is probably due to these conditions or the absence of such. The poison remains in the system, without producing the positive symp-

toms, from three to eight weeks. Some declare that a longer period than even eight weeks sometimes intervenes between inoculation and positive madness; but such cases, if there are such, must be extremely rare. They form the exception, and contradict the great mass of testimony on this subject.

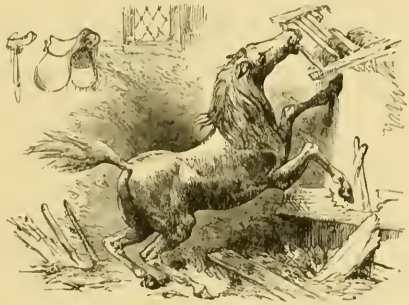
The remote cause—that which produces it in animals of the dog and cat kinds—we need not attempt to discuss, as it can have little if any practical bearing on the subject in hand. It may be well to observe, however, that most of the lower animals contract the disease when bitten by dogs that are violently mad, whereas among men it is widely different. Statistics seem to show that less than fifty per cent. of the latter take the disease. It has been offered in explanation, that the bite is generally through clothing, that serves in many instances to cleanse the teeth of the virus before the skin is reached. In the case of horses, the bite is generally on the lip—a sensitive and vascular part, where the absorbents are readily reached.

COUNTENANCE OF A HORSE WITH RABIES.

How to know it.—Blood on the lips, or elsewhere, with marks of violence, are of course to be regarded as symptoms of dog bite, if any known occasion for such a thing has existed; and for a few days these will be the only indications. If the horse is high fed and full of blood, and the weather is hot, the poison may begin to produce outward effects in from five to ten days by a swelling of the bitten parts, and by a difficulty manifested in swallowing. In from twelve to fifteen days there is perceptibly increased pulsation; inflamed throat, with thickening of the membrane that lines it; from the fifteenth to the twentieth day the stomach inflames, and perhaps rejects food,—but nothing certainly can be stated as to this point, since here the symptoms vary greatly with different animals: in some cases the appetite is voracious, and so morbid that the sufferer will devour his own excrement and urine. Sometimes he will exhibit burning thirst and drink freely, while again water will cause spasmodic movements and be avoided with horror. But in general, the appetite is destroyed, and that dread of water which characterizes the disease in man is present in the horse.

In a very short time the indications increase, and usually (as we have said, with full blooded, feverishly disposed horses, at a time of high temperature) before the twentieth day, absolute madness sets in. He

now rubs the bitten part against anything convenient with increased violence; sometimes instead of rubbing he will bite and tear the wound; the eyes assume a wilder and more unnatural appearance; some patients neigh squeakingly, shove out the tongue, or gnash the teeth. The progress of the disease is now very rapid; generally there is profuse sweating; there is suppression of the urine, and inflammation of the parts of generation; his countenance changes from a look of anxiety to one of cunning and a sort of grinning ferocity, and there is an irrepressible desire to bite man or animal—whatever living thing may be within reach; he gazes sometimes at an imaginary object and springs and snaps madly at vacancy; his propensity to destroy grows with his pain, and at last he wreaks his fury upon inanimate objects—the manger, or trough, the rack, whatever is seizeable in his stall is torn to pieces with his teeth or smashed with his feet; if not confined he darts ferociously at whatever object of attack may present itself; plunges about like a demon of destruction, snorts, foams, sometimes uttering a kind of crying neigh, and perhaps beats himself to death before the last and comparatively helpless stage comes on.



DESTRUCTIVE IMPULSE OF HYDROPHOBIA.

If not destroyed before the disease has run its course, paralysis, usually confined to the loins and the hinder extremities, sets in, and involves with it all those organs which depend for their nervous influence upon the posterior portion of the spinal cord. Unable to stand upon the hind legs, the animal will sit on his haunches, and strike and paw with his fore feet. The suffering is sometimes rendered more terrible by tenesmus or retching of the bowels, which seem dreadfully oppressed but have lost the power to act, while the kidneys are fevered and torpid and the urine cannot be voided.

It sometimes happens that the disease is developed by exertion and heat, when no previous indications have been manifest, and shows itself in a peculiar manner. The horse stops all at once in his work, heaves, paws nervously, trembles, staggers and falls. In a moment he will be up, and may, if put to it, proceed for a few moments, when he will stop, stare about, and lie down again. This stage is sometimes mistaken for blind staggers, but it may be distinguished by observing that in blind staggers the horse loses his senses, while in hydrophobia he is always conscious, often acutely intelligent and observing.

What to do.—This is a disorder of so dreadful and dangerous a character that some of the ablest veterinarians do not hesitate to advise the instant killing of the sufferer; and they refuse to give any directions for attempting a cure. When the furious stage has come on there seems to be a sort of demoniac maliciousness and treachery, with a watchful cunning, that makes it hazardous for friend or stranger to trust himself anywhere within reach. It is extremely doubtful, too, whether recovery ever takes place after the madness is developed.

Yet, it is not improbable that much may be done in the way of prevention after the bite has been inflicted. The first step is to check the flow of blood from the part, if possible, to prevent the rapid spread of the poison over the system. If a limb has been bitten, this may be done by tying a handkerchief around it, above the wound, and twisting with a stick until a sufficient degree of compression is had. Then cauterize the wound thoroughly, making sure that the very deepest recesses of every tooth print or lacerated place is reached. Lunar caustic is best, because most easily and surely handled; but if impossible to get a stick of this, any convenient caustic may be applied, as oil of vitriol, nitric acid, caustic potash, butter of antimony, etc.; or, a small iron, not too sharp, heated to a white heat and cleaned of scales, will answer if the animal can be kept still enough to apply without danger of injuring him otherwise. The handkerchief should be left on tight until the cauterization is effected.

Cauterizing thoroughly, even two or three days after the injury, may result in saving the animal, as the absorption does not always speedily take place.

If the wound is upon a part that forbids the use of the handkerchief, it may be cut open to its depth, and a freer flow encouraged, both by the larger opening and by squeezing and wringing—soaking, meanwhile, with warm water. Then use the lunar caustic wherever a sign of tooth mark can be seen.

But when unobserved till the virulent stage has come on, it is not even known to science that anything can be done to save; and the best, the

most merciful thing to do is to shoot at once. When there are strong symptoms of madness, but still some doubt, put him by himself in a stable, bare of everything destructible except food and water, which must be placed where he can get it, and barricade the door. Leave a window open for observation, and keep him here until the symptoms disappear or hydrophobia is unmistakable—then act accordingly.

II. Mad Staggers.

Causes.—This disease is sometimes known by the more learned term of phrenitis (the delirium of fever; frenzy, raving); but it will be by practical men most readily recognized when treated of under its old and familiar name.

It is an inflamed condition of the brain and its covering, with effusion of the small cavities and the spaces between the membrane and the brain itself. Sometimes both the brain and its membranous covering are involved in this inflammation, sometimes but one, and that most frequently the membrane.

It may be caused by concussion of the brain by reason of blows upon the head. The brutality of a driver, which finds its gratification in using the butt of his whip upon the head of the horse, may result in a fractured skull, to be followed by slight pressure upon the brain, a speedy fever and the consequent determination of too much blood to the head, which, combined with the burning inflammation, brings on this madness, perhaps death.

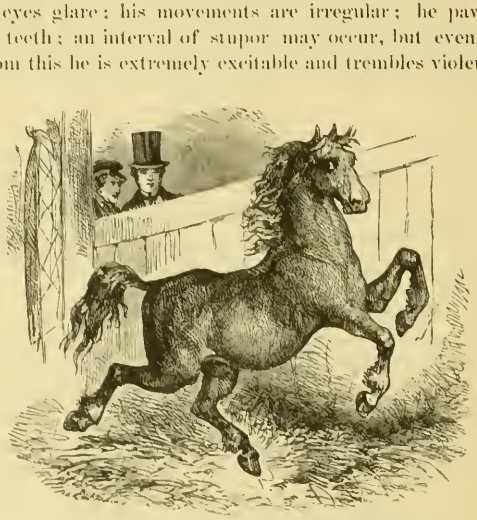
Among the causes other than violence we may name the following: The slugging of the vessels of the brain with clots formed elsewhere in the system by some abnormal action; the growth of tumors upon the brain or upon its covering, from some remote and probably hidden cause; sudden and great changes of temperature in the body brought about by instantaneous exposure to extreme heat or cold; over-exertion in plethoric or full-blooded animals, especially in hot weather; congestion from close collar, short-drawn check, or tight throat-latch; congestion from internal compression, as by over-loading stomach and bowels; feeding on parasitic grasses or smut, of which rye grass may be noted as the most hurtful; infection of the blood by poisonous animal matter or fluids; imprudent over-feeding and insufficient exercise.

How to know it.—The symptoms often differ but little from apoplexy, comparing the *first stage* of each, but they may generally be distinguished by this: that in mad staggers the horse is not so comatose, or sleepy and insensible, as in apoplexy. Light affects his eye a little, and he is sensitive to the whip, whereas the horse laboring under a genuine attack of

apoplexy seems blind, deaf, and without bodily feeling. In some instances in mad staggers, it is true, the animal may sleep till he drops, but on recovering himself he will manifest the sensitiveness above described.

Occasionally, the brain alone is involved, in which case he is stupid, dull, and awkward of motion, the nerves of sensation and of motion being both affected; and during this stage he will sometimes bore his head against some object; at others he will rest his haunches upon his trough or anything else convenient.

When the membranes covering the brain are inflamed, which is most generally the case, there is restlessness rather than stupor; the horse trembles; his general temperature is elevated, while there is great heat about the upper part of the head; his pulse is excited, his breathing quick; his eyes glare; his movements are irregular; he paws, stamps, champs his teeth; an interval of stupor may occur, but even when just aroused from this he is extremely excitable and trembles violently.



HORSE DURING THE MAD STAGE OF STAGGERS.

When the worst symptoms are rapidly developing themselves he begins suddenly to heave at the flanks; his eyes brighten and his nostrils expand; the pupil of the eye dilates to the utmost, and stares wildly and vacantly; his breathing becomes shorter and quicker; sometimes he will neigh uneasily; his ears are erect and bent forward; the membrane of the eye reddens and contrasts strangely with the clearness of the cornea or ball; he becomes more and more excitable, and trembles at every sound, and

delirium sets in. He now dashes himself about with fury; his motions are sudden and violent, but without any disposition to mischief, as he is evidently unconscious. He sometimes becomes ferocious, and dangerous to all who may come within reach; he then bites and strikes at those who come near him; he plunges, rears upon his hind legs, whirls round and round and falls with dreadful force. He will now lie awhile exhausted, and his pulse and breathing are slower.

At length the mighty anguish returns, and he becomes again a terrifying and dangerous animal. The second paroxysm is worse than the first; he darts furiously at everything within reach; sometimes bites and tears himself; and this continues until his former stupor returns, or until he has worn himself out and death puts an end to his sufferings. Each succeeding attack increases in intensity, and brings on increased weakness, so that his periods of stupor become longer and longer till at last he dies.

In those cases where at first only the brain is involved the premonitory symptoms may continue a day or two, when the membranous coverings may become suddenly inflamed and delirium speedily set it. Whenever the membranes are attacked the disease reaches its crisis in a few hours—there must be speedy relief or death will quickly follow.

This disease may sometimes be mistaken for colic or for hydrophobia; but to distinguish from the former, notice that in the colic the horse rises and falls with less violence, and that though he sometimes plunges, he more frequently rolls about. He looks frequently at his flanks with an expression of pain, and he is all the time conscious. To distinguish it from hydrophobia, observe that while there is violence in the latter, and generally an inclination to do mischief, there is always consciousness.

What to do.—If the earlier symptoms—stupidity, sleepiness, awkward, staggery motions—are observed, apply ice cold water to the head, both by pouring and by means of a sponge or rags secured between the ears and along the forehead; and bleed severely—not enough, however, to render the horse faint. Then give an active purge, as the bowels will almost invariably be found to be torpid and constipated. Use at first:

No. 145. 7 Drachms aloes,
4 Drachms castile soap,
6 Drops oil of caraways.

Mix with mucilage or syrup to form a ball, and give this quantity for one dose. If this is found, after four hours, not to have produced the desired effect, give one scruple of *croton meal* in water, if he will drink it; if not, he must be drenched. This is a powerful medicine; but it is of the utmost consequence that his bowels be free, and no effort must be spared to effect that object. If the croton cannot be had, resort to the clyster (of warm soap suds), or to back-raking.

The bowels having been opened, give two or three times a day, the following compound, the effect of which is to decrease the action of the heart and prevent the tendency of the blood to the head, as also to promote the activity of the urinary organs:

No. 146. 1 Drachm digitalis,
1 ½ Drachm tartar emetic,
3 Drachms niter.

Keep him in a cool, airy stall, and feed with the greatest moderation, giving such green and moist food as has a laxative tendency, and such quantity only, for a few days, as will prevent gnawing hunger.

But if the paroxysm has already come on when remedial means are to be adopted, seize the first opportunity, during an interval of stupor, or of comparative stillness, to bleed him till he falls, or, if down, till he grows faint and weak. Open the vein on both sides of the neck, if possible, as the quickness with which the blood is drawn away from the brain is of almost as much consequence as the quantity. The operator must observe great caution, as the fury may return suddenly and with much danger to himself.

If successful in bleeding, the next step to take is to purge in the least possible time. To affect this, use *half a drachm of croton meal*. Sometimes the horse will drink readily and freely, in which case the meal can be well stirred in water and given in that way; but if necessary, pour it down him according to directions for drenching. If the meal of croton cannot be had instantly, give *an ounce of aloes* dissolved in hot water. If this does not act within four hours, give a quarter of an ounce more, and so continue till purging is produced. The next step is to give as a sedative the digitalis or powdered foxglove, etc., as previously directed. It may be necessary to back-rake and then give a clyster of warm soap-suds.

All this will of course leave the creature in a dreadfully depleted and weak condition; but the only hope of saving him lies in the use of powerful means, especially when delirium has already set in. It may not be possible in every case to bring him back to fullness of life and usefulness, even with the best of care. At all events, he must be treated gently thereafter, and guarded from excitement, as the attack is otherwise likely to recur.

III. Blind Staggers.

Causes.—This disorder, by some called megrims, by others vertigo, and still by others dizziness, is not well understood; and there is a difficulty in determining whether some of the forms it assumes ought not to be set down as separate diseases. The causes, however, that will produce

certain manifestations in one horse will produce different ones in another, so that it may be readily inferred that the varying symptoms do not mark different types of disease but mere difference of degrees; and that the same general causes act throughout.

The *immediate* cause is clearly pressure on the brain, resulting from unusual flow of blood to the head. This is doubtless in some instances the result of a constitutional tendency—a predisposition to epilepsy—that is brought to manifest itself on occasion of excitement, over-exertion, or general ill condition of the digestive apparatus. In others it is most probably a watery suffusion of the brain—the blood being subjected to some sort of decomposition in its passage through the head and leaving the serum or watery portion to collect there.

The brain requires a proportionately far greater amount of blood than any other organ; but while ample means are provided for supplying it, nature guards against doing this with that velocity which would endanger it by overloading and rupturing. The arteries make their way through the head in a peculiarly circuitous manner, and they enter through minute bony holes that will not admit of much distension. When the horse is overheated, however, or when the return of the blood is impeded, this fullness takes place. In great heat the arterial passages are enlarged to their utmost capacity, and the rapidity with which the now uncommonly heated and the thinner fluid makes its way into the brain is not counterbalanced by a similarly rapid return, and the effect is produced to which the various names referred to have been given. Impeded return of the blood from the extremities, through the veins, is caused by a tight collar, pressing, during the act of pulling, upon the large or jugular vein, on one or both sides of the neck; by a tight throat latch, producing a similar compression of the jugular; or by a check-rein drawn so short as to bring down the head, and bend the neck to the extent of crowding its parts together and interfering with the circulation. By this compression, though the blood may not be forced to any undue arterial activity, the large veins will be too long distended by reason of the sluggishness of return, and the small veins running through the substance of the brain will be so increased as to press upon the nerves at their points of origin and produce loss of power and of consciousness.

The immediate cause, or pressure upon the brain, is doubtless sometimes to be found in tumors, arising from blows on the head, as well as in congestion, or too great fullness.

Other remote causes besides those already named may be found in a diseased stomach and intestines. Inflammation of all the organs of digestion and secretion may be brought on by the retention of great masses of indigestible food, and this clogged state superinduces conges-

tion by a sort of internal compression, and this tendency is of course increased by rapid exercise and the consequent heat. That this is one of the primary causes is evinced by the fact that constipation attends nearly every case. Indigestion and foul stomach are the natural results of confinement in hot and badly aired stables, unwholesome food, or food in excess of the quantity required by the amount of daily exercise, of extreme cold, of extreme heat, and of great fatigue. Hot weather, when the horse is of full habit, will sometimes derange the digestive functions, and undue exercise will then quickly develop a case of blind staggers.

Draft horses, and particularly those that are young and of a plethoric or full blooded tendency, are most subject to it, though it is not confined to any age. It is rarely the case that a horse under the saddle is attacked with it.

The dread of the whip, combined with the consequent fretting and interference with both the digestive and circulatory functions, is thought to produce it in sensitive horses.

It is ordinarily regarded as an incurable disease. If there is an organic predisposition to epilepsy, entire recovery is of course out of the question; and when a horse has been once attacked, though previously free from any such tendency, he is subject to a return of the complaint because the vessels have been weakened by violence, and offer less resistance to the rapid flow of blood in the arteries, or the abnormal gathering of it in the small veins of the brain.

How to know it.—In its final manifestations it is unmistakable; but the careful and intelligent owner ought to be able to detect some symptoms of an approaching attack in time to guard against its most hurtful effects. That condition of body which superinduces congestion by internal compression and derangement is not difficult to detect, and attention to this may be the means of warding off a violent attack. This is indicated by an offensive breath; somewhat impeded respiration, or expelling of the air from his mouth only partly masticated; a foul tongue; a dry and clammy mouth; disposition to plunge his head into the water above the nostrils when drinking; fæces (or dung) hard and difficult to pass; and urine ejected in small quantities.

As previously observed, the attack very seldom comes on while the horse is ridden, but while he is being rapidly driven, or after he has been subjected to a long, hot pull under a tight collar, a closely-drawn check rein, or a throat-latch buckled almost chokingly.

Occasionally the attack will be sudden and without the slightest warning; he will fall almost as though shot, or make an effort to run around

and then fall; usually he will first exhibit some signs of uneasiness, as shaking the head and twitching the ears, and the eyes, if observed, will be found to have a wild, staring and bloodshot appearance. Sometimes he will stop and stare about—look wild and irresolute—and then go on as though nothing were the matter. Again, he will rear up or stagger like a drunken man, and then fall. He often becomes stubborn, and will go only his own way—evidently unconscious—and then come convulsions, followed by insensibility.

EXPRESSION CHARACTERISTIC OF MEGRIMS

When down, it occasionally happens that he lies in this insensible state at first, but he usually struggles violently, then becomes quiet; gradually recovers himself, and gets up, ready to proceed on his way—being yet dull, however, and evidently affected by what has happened.

What to do.—When it is discovered in time that he is suffering with disordered digestion and is constipated, relieve him from work, if possible, and lessen the quantity of dry food. Turn him out at night, at any rate, even if found imperatively necessary to have his services during the day. If he can have some continued rest, and the run of a good pasture, or else be well fed with food suitable to his condition, and well watered, while occupying a roomy, dry and well-ventilated stable, his chances for restoration to health and escaping violent attacks altogether, will be greatly increased. Of course he should have sufficient exercise, but in moderation. If the animal is young, and of full habit, yet fallen into this disordered state, restrict his diet, increase his exercise by degrees, or turn him out to pasture until his normal condition of stomach and bowels has returned.

In the beginning of this treatment as to diet—what may be called the *preventive* treatment—give him the following purgative:

No. 147. 7 Drachms aloes,
4 Drachms castile soap,
6 Drops oil of caraway.

Mix with mucilage or syrup sufficient to form a ball. This amount constitutes a dose. It may be repeated after twelve or fifteen hours if the first does not produce proper action.

But if these premonitory symptoms pass unobserved, or if it is a case of sudden attack owing to violent exercise, great heat, or development of epileptic tendencies, stop him, if driving, upon his showing any of the indications described, and go to him; examine collar, check-rein, throat-

latch, and see that all is right; pat and soothe him, and allow him to stand for a few moments in quiet. Where it is found that the collar has been pressing the neck veins see that it is altered without more ado—either by cutting or by pressing in against the breast on the lower part of the collar a cloth of sufficient size to prevent its tightening upon the sides of the neck. If he recovers sufficiently to be driven, allow him to move at a very moderate pace; if not, remove him from the vehicle and lead him home. When there he must have rest and quiet, and care must be taken, as previously directed, to bring him, by food and laxatives, into a good state as to stomach and bowels.

When the attack is so violent that he rears, plunges, and falls, bleed as soon as he becomes composed enough to allow it—taking from the neck vein from three to six quarts, according to the violence of the fit, and the weight, fullness, and fleshiness of the patient. During the first paroxysms of his attack dash cold water over his head, if it can be had; and a wet sponge made fast between his ears will be found useful.

From these violent attacks, entire recovery is doubtful, even though he may not die outright; but every chance of even a partial return to health and usefulness is increased by rest. A horse once affected in this way should really not be driven again, though apparently recovered, for the fit is likely to recur, and the driver may himself be thereby seriously endangered.

The necessary steps as to feeding and care, and the administration of laxative medicine have already been pointed out.

IV. Apoplexy, or Sleepy Staggers.

Causes.—The different stages of this disease are sometimes treated as though they were two different types; and we find even professed veterinarians, who ought to be more discriminating, so regarding them. Apoplexy is the term by which alone it should be known—the state of sleepiness and staggering being but premonitory symptoms, or rather the earliest stage.

The *immediate* cause of this disorder, as in blind staggers, megrims, vertigo, giddiness, dizziness, or by what other name the disease previously treated may be known, is undue pressure upon the brain, and their remote causes are generally identical also—the difference in the diseases being simply a difference in the modes of their manifestation.

Post mortem examinations of horses that have died of apoplexy, have sufficiently indicated the cause. The vessels of the brain are found to be peculiarly bloated or distended with black blood. Sometimes there may be no inflammation of the membranes of the brain, but the stomach is found loaded with undigested food or the intestines with foul matter. It

is clear that congestion of the brain, perhaps of the venous system generally, is the condition that prevails when the disease manifests itself in its active and violent stage. And this too great fullness of blood is in most cases owing to disordered digestion, which may be brought about in two ways: the horse may be overfed and subjected to insufficient exercise, so that the stomach becomes weak, and lacks the power to digest or expel the food; or he may suddenly gorge himself when chancing to come upon abundance of food of which he can partake without restraint. The fulness of the stomach and bowels produces that internal compression which precludes the regular flow of blood through the veins, and weakens the venous system, and the brain soon becomes overcharged, and that, too, with a fluid in a degree poisonous for want of perfect oxygenation, or purification by being regularly passed through the lungs and exposed to the air. Hot weather is peculiarly favorable to the attack, both because of the more debilitated state of the system from heat, and because the heat predisposes a more rapid arterial flow of blood, that is not counterbalanced by an equally rapid return of the blood through the veins to the heart and lungs.

Luxuriant pasture, warm weather, and the dependent posture of the animal's head in his continual cropping, especially if he is in over-condition and full of blood, may readily produce apoplexy—the immediate and the remote cause in this case seeming to act simultaneously. Horses in poor condition may be attacked after having been overworked and reduced to a debilitated state through want of care and of nourishing food. Put upon rich pasture, with a ravenous appetite, they are apt to gorge and bring on indigestion and its attendant constipation.

There is sometimes a softening of the brain, rather than effusion or too great fullness, and this may arise from tumors, caused by blows, or by the plugging of the vessels with clots of fibrous matter.

How to know it.—This differs from blind staggers or megrims in this, at least, that the prevailing symptoms force themselves upon the attention of the ordinary observer while the horse is at rest. He exhibits at first a want of appetite, and is more than usually dull. When he walks his movements are slow and unsteady. Examination will discover his pulse to be slow, heavy and dull, yet full. When he is exercised a little these symptoms go off, but they soon return when he is left to himself, and more unmistakably. In the open air he balances himself as though about to fall, and stands with his head depressed. In the stall he bears upon the trough or the wall, and a good deal of his weight seems to be supported in this way. Sometimes he gets his head against some rest, stands for a length of time, and then drops as though shot, but presently gets upon his feet again, to relapse into the same sleepy listlessness.

When in this condition it is dangerous to be near him, or to attempt to move him. When aroused from this apparent sleep he looks vacantly around, glares unmeaningly, and sometimes the eyes will not close when an object is moved before them—and the indications are that he neither sees nor hears. If food is within reach he will sometimes take a mouthful, but lose consciousness while it is yet but half chewed; and if he attempts to drink, the power of swallowing seems to be partially lost, and the water will return through his nostrils. As he grows worse he will twist his legs over each other when trying to go straight forward. In the last stage he begins to foam at the mouth; his breathing becomes loud and laborious; the pulse is depressed; the jugular veins are distended almost to bursting: the muzzle is cold, and sometimes he discharges fæces almost involuntarily; he grinds his teeth; twitchings steal over his face and limbs; and at last he falls into convulsions and beats himself about in a terrible manner. There is no disposition to do mischief—he is evidently well nigh unconscious. All the powers of life are wrought upon, and death speedily results unless some powerful means can be brought to bear to bring instant partial relief.

It is well to caution the reader against mistaking for an apoplectic sign a certain sleepy, listless, stupid expression of countenance that is brought on by repeated attacks of megrims. A little examination will generally disclose that all the other symptoms of apoplexy are wanting.

What to do.—That treatment which will most speedily relieve the overloaded vessels of the brain is clearly best. If anything is done before the violent stage of the disease comes on, bleed freely from the neck vein—so freely, indeed, that the horse falters or begins to blow. If the case has been neglected until the violent stage is upon him, bleed, if possible, until he falls. It may sometimes happen that a lull in the paroxysms ensues, and even at this late hour it is well to make the attempt to save by drawing blood.

Next, determine, if possible, whether the cause is a present-existing gorged stomach, and constipated, torpid bowels. If so, use the stomach pump promptly. Force warm water into his stomach till the food is so thinned that it may escape by the pylorus and by the mouth and nostrils. When this extreme fullness of the stomach is overcome, give a purgative bolus as follows:

No. 148. 7 Drachms aloes,
4 Drachms castile soap,
6 Drops oil of caraway.

Mix with mucilage or syrup to form a ball, which give as a dose.

If the constipation is obstinate, and does not yield to this purgative,

stir a handfull of fine salt in one gallon of warm water, and inject it into his bowels. This failing he must be back-raked.

When the system is once relieved the digestive functions may be stimulated by giving, every four hours, for two days, a wine-glass-full of

No. 149.
4 Ounces fluid extract of black pepper,
6 Ounces fluid extract of ginger,
2 Ounces hyposulphate of soda,
4 Ounces water.

Dissolve the soda in the water; then add the ginger and pepper.

Attention must now be paid to diet, at first reducing it to a small quantity, and to such in quality as will have a laxative tendency. He may be turned upon a pasture, if it is not too rich, but he should have food administered morning and evening in moderation. He should have free access to water.

In the beginning of the paroxysm it is sometimes found advantageous in quieting him somewhat to apply ice to his head, or to pour a stream of ice cold water steadily between his ears.

Until he is so far recovered as to render it safe for him to go to pasture, keep him comfortable. If the weather is hot—and it usually comes on during hot weather—keep him in a cool, well-aired place, or in an open place well shaded.

Complete recovery is seldom to be hoped for. Generally, the horse once severely affected, is useless for Summer work, though well able to go through that of Winter, if properly cared for.

As in the blind staggers, the unnatural distension of the blood vessels renders a recurrence of an attack very probable; and it may be brought about by external compression, so that tight collars, tight throat latches, and short-draw check-reins, should be avoided. A breast-strap should be substituted for a collar, and overwork should be specially guarded against.

Apoplexy is not contagious, though it has been so regarded. If more than one horse on the same farm or in the same stable is affected with it, be assured that the same causes are present for both, and that when they are removed the danger of new cases ceases.

V. Abscess Within the Brain.

This not unusual and terrible affection is produced almost invariably by external injury. From being struck or striking against some hard substance, as in running away, striking the head in the stable, or other similar cause. It is possible the owner may know nothing about it. A

wound, perhaps a trivial looking one, is found on the head, from which perhaps only a little watery fluid issues. Soon the horse becomes dull, and from day to day gets worse, refuses his food, and at last falls and commences knocking his head against the floor or on the ground; thus he continues until at length death comes to his relief.

A HORSE DYING FROM ABSCESS WITHIN THE BRAIN.

What to do.—There is nothing to be done once an abscess forms within the brain. The only means of cure is to allow the matter to escape. The thick muscles covering the cranium of the horse would prevent the use of

A HORSE, MAD FROM INFLAMMATION OF THE BRAIN.

the trephine, and if, indeed, a hole was made through the skull to the brain, and perchance the abscess cured, who would want the horse?

There is but one sensible way: kill the suffering animal and end its misery at once.

Another terrible affliction of the brain, fortunately not common, is inflammation of the brain, or phrenitis. It is indeed madness, with the exhibition of terrible strength, which no human power can cope with to successfully relieve, in its frenzied state.

If discerned in its earliest stage, before violent frenzy attacks it, resort may be had to bleeding. Open both neck veins and allow the blood to flow until the dull, heavy, listless expression brightens or the animal sinks. Bleed again if necessary. Give 8 drachms of aloes, and repeat at the end of three hours, if the bowels are not thoroughly relieved, or the pulse changes for the better. Afterwards give 20 to 30 drops of tincture of aconite, or half a drachm of the powdered root infused in a pint of hot water, or a drachm of digitalis, infused in the same way, to be given cold every half hour until relief is obtained. In ninety-nine cases out of a hundred, however, relief will come in death.

CHAPTER XI.

DISEASES OF THE MUSCLES AND TENDONS.

I. BLOOD SPAVIN.——II. BOG SPAVIN.——III. CURB.——IV. THOROUGH PIN.——V. TETANUS, OR LOCKJAW.——VI. CRAMPS.——VII. RHEUMATISM.——VIII. STRING HALT.

I. Blood Spavin.

This may be defined as a distension, or enlargement (dilatation) of the veins of the hock joint, and overlying the seat of bone and bog spavin; a local venous congestion, caused generally by swelling, impeding the flow of the blood, and often connected with bog or bone spavin. It is harmless; in fact it may be considered as accompanying, or the result of other disease of the joint.

What to do.—In the early stage cold water perseveringly applied, followed by cooling lotions, equal parts of alcohol and rain water, or one pint of brandy to one-half pint of water, applied as a lotion. If this does not relieve the difficulty, use a strong infusion of bayberry bark, using considerable friction by hand rubbing with either of the remedies named.

II. Bog Spavin.

Common bog spavin is technically (as is windgall) an enlargement of the Bursa Mucosa, just as a distension of the sub-cutaneous (beneath the skin) veins in the region of the hock is called blood spavin. These cause an undue secretion of joint oil and a dropsical effusion into the joint, producing swelling having all the character of inflammation of the true hock joint. This inflammation of the upper or principal hock joint is true bog spavin.

Causes.—Overwork, sprains, injuries either from punctured wounds, fractures or bruises: also from the effects of rheumatism. All produce inflammation of the structures of the joint.

How to know it.—In its acute early form there is a tense, puffy, fluctuating swelling of the front and inside portion of the hock at the upper or principal point just where usually there is a depression. There is also a swelling behind, where thorough-pin occurs, but it can be pressed forward, the anterior (front) swelling filling up; but there is no swelling below and behind the hock as in thorough-pin.

What to do.—Absolute rest and the use of a high-heeled shoe. Continued pressure on the swollen parts, by means of a truss or compress, with cold water applications, or brandy and salt.

In case there is much inflammation reduce it by means of fomentations of water, and if there is pain let the fomentations be an infusion of hops. In the later stages use tincture of arnica diluted with water. If the case is a bad one, when the extreme heat and tenderness has subsided a blister may be applied, since it sometimes goes on to ulceration of the joint, and even to bony deposit destroying all movement of the joint. See No. 160 and 161 for blisters.

III. Curb.

This is a swelling in the middle of and just behind the lowest part of the hock joint. At first it is soft and doughey, or retaining for a time the shape of the pressure, producing an enlargement about two inches below the hock. Curby hocks are also sometimes congenital and hereditary.

Causes.—A blow, but more frequently a sprain of the tendon, or of the sheath through which the flexor tendon passes. The ligament of the hock when injured increases the gravity of the disease.

How to know it.—There is heat, inflammation, tenderness, lameness, and a tendency to knuckle forward at the fetlock.

What to do.—Absolute rest, a high-heeled shoe, and cold water bandages will generally remove the difficulty if applied in the early stages of the disease. If, from neglect, the lameness becomes decided, apply the following:

No. 150. 1 Ounce powdered bloodroot,
1 Ounce turpentine,
4 Ounces acetic acid.

Apply night and morning for a week or ten days and afterward bathe daily with vinegar

If coagulable lymph forms, threatening callosity, (a hard swelling) daily and long-continued friction—hand rubbing downward—and the application of a more decided stimulant will be indicated. If so, prepare the following:

No. 151. 1 Ounce oil of cedar,
1 Ounce oil of majoram,
1 Ounce oil of sassafras,
1 Pint soft soap.

Use this daily, rubbing always downwards.

IV. Thorough Pin.

Causes.—This is a sprain of the flexor tendon behind the hock, and which has a large sheath which extends both above and below the joint—a dropsical enlargement of the sheath of the tendon, so the fluid contained may be pressed from one side to the other. Hence its name.

How to know it.—Pressure on one side will cause bulging on the other, and pressure on both sides will cause fluctuation along the tendon below and behind the hock.

What to do.—Use the same treatment as for curb; cold water bandages, or hot fomentations in the early stages of the disease; also absolute rest and a high-heeled shoe. When tenderness ceases and lameness is gone, apply a spring truss, so the pads will clasp and cover the puff on both sides, and exert a pretty firm and steady pressure. Success in removing the puff has occasionally been had by puncturing the lower part of the swelling, into the sack, and injecting a solution of the following strength:

No. 152. 10 Grains sulphate of zinc,
1 Ounce rainwater.

Inject one or two tea-spoonfuls, as the case may require. Then bring the walls of the sack closely together and hold them so for a week by means of a firm flannel bandage.

Another plan is to apply with gentle rubbing, the following ointment every day until the skin is inflamed:

No. 153. 1 Part biniodide of mercury,
7 Parts neats foot oil.

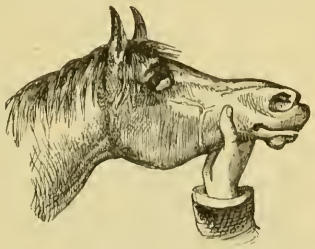
Rub together, either in a mortar or with a spatula on glass, until intimately incorporated, and use as directed.

V. Tetanus, or Lockjaw.

This terrible affliction, which consists of persistent and often acutely painful drawing together (cramps) of the voluntary muscles, causing extreme rigidity, drawing together the whole muscular system, and closing or locking the jaws.

Causes.—Often a wound in the leg or foot, seemingly of the most trivial character, as the prick of a nail. It is also produced by castration nicking and docking; by hard riding or driving, and leaving the animal shivering in the night air. When it proceeds from a wound, it is called traumatic: when from no apparent cause, it is called idiopathic. It rarely occurs from wounds until they are well advanced toward being healed; though it may display its symptoms immediately upon or a month after the hurt, but generally from the sixth to the fourteenth day.

How to know it.—In the earliest stages there will be stiffness and rigidity of the muscles near the injury, and the limb will be moved with difficulty. There will be excitement, the ears will be pointed forward, the head elevated, the legs stiff and stretched out; the horse will seem excited and yet obstinate to move; the tail will quiver and the skin and flesh will feel hard like a board. The lower jaw being taken in the hand and the head raised, if the haw projects over the eye, you have a case of lockjaw. See cut.



THE TEST FOR TETANUS.

What to do.—Give the animal a loose or box stall, and in the most quiet place possible, and where it will see no one except the attendant. Place slings beneath him so he can stand clear of them or rest in them at will. Remove all straw, litter or other sources of excitement, and avoid all noise or unusual movement. Keep the stable darkened and without other animals present. If the disease is produced by a wound examine it, and if contracted or containing pus (matter) widen it, and cover with

a bread and milk poultice containing laudanum or extract of belladonna.

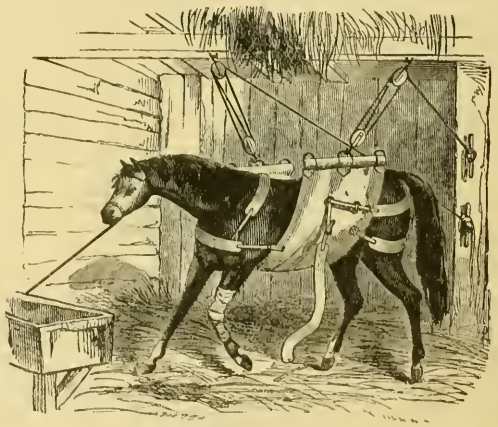
Give a powerful purgative, as the following:

No. 154. 6 to 8 Drops croton oil,
4 to 6 Drachms powdered aloes.

Dissolve in a pint and a half of water and give as a drench. If it cannot be given by the mouth administer it through the nostrils by means of a stomach pump and the horse catheter, to be hereafter shown, in feeding; or prepare the following, if the horse can swallow a ball:

No. 155. 4 Drachms powdered aloes,
4 Drachms extract of gentian,
1 Scruple croton farina.
Mix with linseed meal and molasses into a ball.

Follow this up with three doses daily of anti-spasmodics, as, one to two drachms belladonna, or one-half ounce chloral hydrate, or one-half to one ounce dose of tincture of lobelia in a pint of water. Give by the mouth if the animal can swallow; if not, as an injection. Keep the bowels open with one drachm podophyllin and two drachms extract of belladonna, smeared on the back of the tongue.



SLINGS FOR TETANUS, OR FOR FRACTURED LIMB.

If the animal can bear it, a thorough sweat with a blanket wrung out of hot water, and covered with dry blankets will do good. Feed with nourishing gruels if the animal can swallow; if not, give nourishment as shown in the engraving.

Attach a horse catheter to a stomach pump, pass the end carefully up the nostril and into the gullet, as shown. If coughing is produced, withdraw the catheter and commence anew. If two feet are inserted without

MODE OF FEEDING HORSE HAVING CHRONIC TETANUS.

alarming symptoms, pump in only a quart of linseed gruel, if the horse has fasted for some time, and as the stomach can bear it, give more. This, however, must not be attempted while the disease is in its acute form (its earlier stage), but after the disease assumes a chronic form it may be resorted to.

SHOWING HOW FAR AN ANIMAL WITH TETANUS IS CAPABLE OF MOTION.

The disease is apt to leave the animal in a most deplorable condition, and it will be a long time before it becomes serviceable, if indeed it ever

does. Six weeks or even two months may be required before the animal regains the use of its powers. The cut annexed will illustrate the condition of a horse with tetanus.

It will thus be seen that in a decided case it will be policy as well as humanity to seriously consider whether it may not be better to relieve the sufferings of the poor animal at once by shooting through the brain.

VI. Cramps.

Some horses are quite subject to cramps of the muscles and tendons. It may be an irritability or spasm of a particular muscle or set of muscles, which refuse to act, becoming stiff and inflexible. They cramp and sometimes twitch excessively. This is again succeeded by another stage in which the muscles relax and are restored to their normal condition.

Causes.—Strains, bruises, or over-taxation of the powers. In many cases it is undoubtedly allied to rheumatism, a disorder attacking horses much oftener than is supposed; rheumatism very often being attributed to bots, founder and various other causes by the ignorant. Both diseases are quite painful, and leave the animal very sore, and rheumatism often for months.

What to do.—Clothe the body warmly, find the seat of the difficulty by feeling of the parts until the sore place is touched. Wash the parts with salt and water, and rub dry. Then apply the following liniment:

No. 156. 1 Part solution of ammonia,
1 Part spirits of camphor,
1 Part olive oil.

Rub it in well, and hold a hot iron or brick to the parts to heat it thoroughly.

VII. Rheumatism.

This is a peculiar form of inflammation attacking the fibrous structures of the body, such as the joints, tendons, ligaments and muscles, and is accompanied by stiffness, exceeding tenderness and pain, shifting from place to place, often implicating the valves or other structures of the heart, and when so usually results in death.

Causes.—Exposure to cold, wet or drafts, especially when the system is overworked. There is usually a constitutional predisposition in the subjects, and in such it is easily brought on by diseases of the respiratory or digestive organs, especially in horses of a full, gross habit.

How to know it.—In its acute form there is dullness, followed by ex-

treme lameness in one or more of the limbs. There is tenderness and then swelling of the joint, tendon or muscles, at first soft, then hard. There may be fluctuations from excess of synovia (joint fluid). With the inflammation there is fever. The pulse is full and hard; the mouth is dry and clammy; there is hurried breathing, scanty urine and costiveness.

In the chronic form the symptoms are the same as in the acute, but not so pronounced, and in this form it is unattended with fever. It may appear only upon undue exposure, or in damp, lowery weather, and disappear again upon the recurrence of fine weather. Chronic rheumatism is also less inclined to shift from place to place.

What to do.—For rheumatism in its early acute stage relieve the bowels by laxative medicines, say four ounces of aloes. Put the animal in slings, as for tetanus, and clothe him from the hoofs to the ears in flannel. If practicable the first thing is to fill the box in which the horse is kept with steam, keeping it up for an hour. If the pain is extreme lessen it with ounce doses of laudanum.

Give the following three or four times a day as a drench in a pint of gruel:

No. 157. 1 Ounce bicarbonate of soda,
1 Ounce Salicylic acid.

If this cannot be obtained, give the following, at a dose, night and morning:

No. 158. ½ Ounce powdered saltpeter,
1 Drachm powdered colchicum,
1 Ounce oil of turpentine,
Mix in half a pint of linseed oil.

For rheumatism in its chronic form the following will be found to be valuable, used internally:

No. 159. 1 Ounce powdered carbonate of potash,
1 Ounce powdered saltpeter,
2 Drachms iodide of potash.

Give in one and a half pints of water.

As a liniment for the joints and other affected parts, to be afterwards wrapped in flannel, the following is excellent:

No. 160. 1 Pound compound soap liniment,
2 Ounces liquor ammonia,
2 Ounces tincture cantharides,
2 Ounces laudanum.

Rub in with as much friction as the horse can bear, and apply until

signs of blistering are apparent. If this does not produce the desired effect, use the following:

No. 161.
¼ Ounce laudanum,
½ Ounce camphorated oil,
1 Ounce tincture cantharides.

Apply to the joints with a soft brush, but without friction.

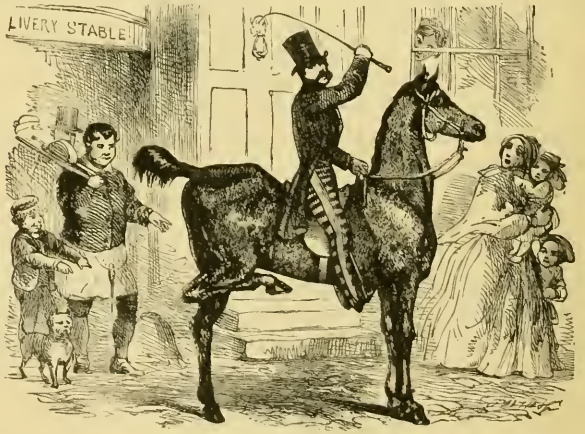
A soothing and stimulating embrocation, when so severe measures as the foregoing are not considered necessary, may be made as follows:

No. 162.
1 Part spirits of camphor,
1 Part solution of ammonia,
1 Part olive oil.

Mix, and apply by rubbing it in.

VIII. String Halt.

String-halt is the sudden jerking up of a hind limb, sometimes both in succession. Sometimes several efforts will be made before the animal can progress at all. In other cases the spasmodic action of the hind leg is shown in starting off, and the animal becoming warm, it will nearly or quite cease. An exceptionally bad case is shown in the illustration given below.



A HORSE HAVING STRING HALT.

Sometimes the action is so slight as to be almost unnoticed, and again it may be so strong that the hind leg will strike the belly.

Causes.—The causes are unknown. It is supposed to be produced by a variety of injuries, but principally as a reflex nervous action. It increases with age and hard labor, and nervous excitement, and is a positive unsoundness.

What to do.—There is no cure. Rest, keeping the bowels open with 2 drachm doses of belladona daily, will lessen the spasms for a time; but fatigue or nervous excitement is sure to bring on a recurrence of the attack. A careful driver will often prevent the disability being much shown by being careful not to excite or overwork the horse.

CHAPTER XII.

DISEASES OF THE EYE.

I. NATURALLY WEAK EYES. —— II. SORE EYE-LIDS. —— III. MOON EYES. —— IV. CATARACT. —— V. INFLAMMATION OF THE HAW, OR HOOKS, —— VI. DIMNESS OF VISION. —— VII. WORMS IN THE EYE. —— VIII. PURULENT OPHTHALMY. —— IX. FUNGOID TUMORS IN THE SUBSTANCE OF THE EYE. —— X. IMPEDIMENT IN THE LACHRYMAL DUCT. —— XI. GUTTA SERENA.

I. Naturally Weak Eyes.

Very many persons, otherwise well informed, when from any cause the eyes of horses become weak, inflamed, watery, or drop tears, suppose the cause to be from a natural weakness of the sight. So "blind teeth" are supposed to cause serious trouble, and even blindness in horses. Nothing could be further from the truth. It is exceedingly rare that horses have naturally weak eyes; it can almost always be traced to some local cause. Thus, watering of the eyes is caused by a stoppage of the lachrymal ducts leading from the eyes into the nostrils, the natural channels for carrying off the superabundant moisture of the eye. Inflammation of the eyes is not uncommon from a turning in of the eye-lashes. The remedy is to snip them off with the scissors.

"Blind teeth," or "wolf teeth," as the immature supernumerary tushes are called, do no injury whatever. If it is feared they may, it is easy to take them out with a pair of forceps, or to knock them out with a punch and hammer.

Occasionally a supernumerary tooth may be found growing in the upper jaw, between the first and second teeth, and lapping over both of them. This is considered by many persons as producing inflammation of the eyes. It is true that if pain results, the eyes may be affected by sympathy. This tooth should always be removed, and may be done with a strong pair of forceps. It may cause distress from pain in the jaw; nothing more.

Colts are often subject to inflammation of the eyes in a slight degree, during teething. Examine the teeth, lance the gums, and the eyes will recover. It is a case of sympathy.

II. Sore Eye-lids.

In the outset of more serious disease, soreness of the lids of the eyes is common. It is also produced by irritation of various kinds. In inflammation of the eyes, soreness of the lids is always present. If from other disease, it is sympathetic, and will pass away with the disease itself.

There is one form, however, that is characterized by a redness, swelling and itching, the edges becoming raw and exuding matter. This must have specific treatment.

What to do.—The horse should have a laxative dose if the bowels are not in a natural state. The following will be indicated:

No. 163. 1 Drachm flowers of sulphur,
2 Drachms powdered mandrake,
3 Drachms powdered aloes.

Form into a ball with honey, and give as a dose.

To reduce the inflammation, make a curd, by beating three eggs thoroughly and then stirring them with a quart of filtered rainwater until mixed; let it come to a boil, stirring occasionally. Add half an ounce of sulphate of zinc, and continue the boiling for a few minutes. Bind the curd over the eyes, by placing a portion between layers of thin muslin. The clear water strained through several thicknesses of fine linen is excellent for sore or inflamed eyes of any kind. Wet the lids three or four times a day.

In aggravated cases that will not yield to treatment, and that remain raw and exude matter, the edges should be carefully touched with mercurial ointment, the utmost care being taken that it does not come in contact with the eye.

During the whole treatment the horse must be tied up by two lines to the rear posts of the stall, so he cannot rub the eyes, and must be fed from a nose-bag.

III. Moon Eyes.

This is ophthalmy, recurring at periodic times, or at intervals of three weeks, a month or more, and not, as is often supposed, at the full moon.

Causes.—Hereditary predisposition; from malarial causes; herding in low, damp situations; rheumatic affections; irritation consequent on

teething, and, in fact, where predisposition occurs, from any cause tending to lower the general state of the health.

How to know it.—There will be a sunken look to the eye; the haw of the eye will protrude; the white of the eye may be of a pinkish cast; the eye will be watery; the pupil of the eye will be cloudy, at the edges, and dull and discolored at the center; there will be haziness, milkiness, or a whitish spot may appear, which will continue to overcast the eye. In the intervals between the attacks the transparent coat of the eye will have a hazy, bluish cast about its border, and the iris will lack its natural brightness; the upper lid or eyebrow will be wrinkled or furrowed.

What to do.—Look first of all for carious or defective teeth, and if found extract them. There is a strong sympathy between any difficulty with the teeth and the eyes, though unsound or "wolf teeth" do not, as was once supposed, cause blindness.

Place the animal in a darkened stable; give four drachms aloes, and apply the following lotion twice a day:

No. 164. 20 Grains acetate of lead,
20 Drops belladonna,
1 Quart filtered rain water.

Alternate this twice a day with the following:

No. 165 20 Grains sulphate of zinc,
20 Drops tincture of Malabar bean,
1 Quart filtered rain water.

The physic having acted, give two or three times a day the following:

No. 166. 1 Drachm sulphate of iron,
½ Ounce powdered Peruvian bark.

Mix in one quart of warm water, or give in the feed if the horse will eat it. When another attack is expected double this dose.

Sometimes an ounce daily, for several weeks, of Fowler's solution of arsenic will be serviceable, intermitting a few days occasionally. If, however, the attacks recur, and at lessened periods, the trouble may be expected to end in cataract and blindness.

IV. Cataract.

As a rule, cataract is the result of inflammation of the deep structures of the eyeball (internal ophthalmy or the periodic form). It also occurs occasionally from diabetes and other constitutional disabilities.

How to know it.—Put the horse in a dark place. Take a lighted candle. Three images will be reflected, one from the surface of the eye,

one from the front surface of the lens, and one from the rear surface of the lens. If in moving the light either of the posterior images are changed into a white haze, there is exudation into that part of the lens; in other words, a cataract is forming.

What to do.—Unless the cataract is only just forming the horse will be eventually blind. Give aloes as recommended for moon-blindness, and also the prescription for lotions in that case. Follow this up with digitalis in doses of fifteen to twenty grains daily, alternated daily with six to eight drachms of niter in the water taken. Keep the animal in a dark room; apply blisters to the cheeks and behind the ears, using the following, well rubbed in:

No. 167. 2 Drachms powdered cantharides,
¾ Ounce lard.

Mix thoroughly and rub well in, treating the blisters when formed with linen cloths covered with mutton tallow to keep them running.

Apply also to the eye daily for several months the following:

No. 168. 2 Grains phosphorus,
1 Ounce almond oil.

Mix and keep in a dark, cool place, in a bottle with a ground glass stopper.

V. Inflammation of the Haw, or Hooks.

The haw is a triangular shaped cartilage situated just within the inner corner of the eye. In health but little of it can be seen. Its use is to pass over the ball of the eye to remove dust or other offensive substances from the eye. This is done so quickly that it is difficult to distinguish the action. Its play may be seen by opening the lid of the eye, or by attempting to touch the eyeball with the fingers.

Causes.—This is often produced by inflammation or swelling of other parts of the eye. It may end in producing a hard, bony state, protruding from its place as a whitish lump. When it presents this appearance some persons are fond of cutting out the "hooks" to keep the horse from "going blind." Our advice is, "*Don't do it.*"

What to do.—If there is inflammation and swelling, treat the eye as for ophthalmy (inflammation). In all cases of inflammation of the eyes use the bandage as shown in the cut on next page.

If the inflammation is slight, but active, keep a linen cloth over the eye, or eyes, saturated with the following:

No. 169. 4 Ounces sassafras pith,
1 Quart rain water.

Let it stand three or four hours, and apply cold, straining it as used. If the inflammation is more pronounced, use the following as a lotion:

No. 170. 4 Drachms laudanum,
2 Drachms extract belladonna,
1 Quart rain water.

MODE OF BLINDING A HORSE, AND APPLYING LOTION TO THE EYE.

Also raise the eyelids and swab the inflamed haws occasionally with the egg and sulphate of zinc lotion recommended for sore eyes. If the lachrymal duct is closed, that is, if water runs from the eyes, swab out the ducts well up the inside of the nostrils with weak tobacco water, finishing with clean water, or use the sulphate of zinc in the form of a lotion.

If the blood vessels are overloaded, leeching the lids of the eyes will be beneficial, and in extreme cases half a gallon to one gallon of blood may be taken from the neck vein, to be repeated at the expiration of ten days, if necessary.

The inflammation having subsided, the haws will resume their natural place and appearance, and again become almost invisible.

VI. Dimness of Vision.

Very many horses have defective vision. Some do not see well at night; some are near-sighted; some are far-sighted, as in man, from too great convexity of the eye, or the reverse. Old horses gradually acquire dimness of vision.

There is no specific for defective eyesight. Spectacles would relieve the difficulty, but, spectacles that might be worn by a horse have not yet been invented, and for the reason that they are not practical.

VII. Worms in the Eye.

This is occasioned by a worm (*Filaria Oculi*), and may be extracted by a skillful puncture. It should only be undertaken by a competent veterinary or other surgeon, the horse being first securely hampered so he cannot struggle.

VIII. Purulent Ophthalmy.

Purulent Ophthalmy is confined to the conjunctiva (mucus membrane of the eye), and it is in this membrane that the redness and ordinary swelling of the eyes have their seat. The eyelids are much swollen, and the membrane rises up, puffy and red above the level of the cornea (the transparent disc), sometimes in fungoid excrescences. This species of inflammation is epidemic, and when occurring often, goes through the stable.

What to do.—Place the animal in a moderately dark stable, keep the eyes wet constantly—by means of the cloth shown in the cut with inflammation of the hooks—with the following:

No. 171. 2 Drachms sulphate of zinc,
20 Grains morphia,
1 Pint rainwater.

Use the water tepid if possible, but if used cold at first, it must be so continued, and *vice versa*.

The bowels should be kept moderately open with physic if necessary, or with soft feed, and the same general treatment used as for the other forms of ophthalmy.

If the disease does not yield to this treatment, and becomes chronic, prepare a wash as follows:

No. 172. 6 Grains nitrate of silver,
1 Ounce distilled water, or rainwater filtered through sharp washed sand.

Mix, and drop a little into the eye, daily, from a quill.

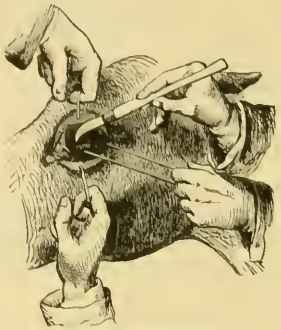
IX. Fungoid Tumors in the Substance of the Eye.

This is a rare affection, and fortunately so. The causes which produce it are obscure, but probably the same as in any other cancerous affection. The end will probably be death, for the taint of the cancerous affection is probably in the system. Upon close examination, the eye ball may be clear, but a brilliant yellow substance may be seen at the base of the interior.

If it be not deemed best to destroy the animal, the eye must be extirpated. Two knives are required, of a peculiar shape, one of small size and slightly bent to one side: the other larger and curved to one side until it nearly reaches the shape of a semi-circle. A sharp scalpel (the knife ordinarily used in surgical operations) will also be required. Two straight, triangular pointed needles threaded with strong waxed twine, a

curved needle, similarly threaded, water, a sponge, lint, injecting tube and a bellows.

Cast the horse, and fasten him so he cannot move. Pierce each eyelid with one of the straight needles and tie a secure loop for raising and holding the lids as shown in the cut.



EXTIRPATION OF THE EYE.

Let an assistant then hold the lids wide open. The surgeon with the straight knife quickly describes a circle around the globe of the eye, severing completely the conjunctiva mucous membrane of the eye. He then takes the small, curved blade, and passing it through the divided conjunctiva it is carried around the eyeball close to the bone, severing the levator and depressor muscles. The cornea is then pierced with the curved needle, in and out, the thread drawn and a loop fixed. Then the eye being drawn out as far as possible the curved knife is passed around the rear of the eye with a sawing motion, the integuments are severed, and the eye is drawn forth.

It is quickly done when all things are ready, but should not be attempted except by a competent surgeon. Some bleeding will follow. Inject cold water; if this do not check the hemorrhage, force cold air into the cavity with the bellows. If this do not avail, plug the cavity softly with lint, bandage the wound to secure the dressing, and leave the result to the natural process of healing.

X. Impediment in the Lachrymal Gland.

The lachrymal ducts of the eyes are small canals leading from the eyes into the nose. Their use is to convey away the superfluous moisture (tears of the eyes). When it is closed by inflammation or other tempo-

rary cause, the water of the eyes flow over the face as shown in the subjoined cut.

OBSTRUCTION OF LACHRYMAL GLAND.

Occasionally, however, the duct becomes permanently closed. The usual remedy is to swab the nostrils where the duct enters with weak tobacco water and afterwards with clear water.

If this do not effect a cure after two or three trials, the duct must be opened with a probe.

The duct commences by minute openings near the terminations of the upper and lower lids at the inner corner of the eye. It comes out upon the dark skin which lines the commencement of the nostrils, lying on the inner membrane.

A delicately thin elastic probe must be used, and about twelve inches long, the horse being cast and securely fastened. It may be necessary to introduce the probe both from the corner of the eye and from the nostril. Next charge a fine pointed syringe with tepid water and placing the point into the nasal termination of the duct, force the water through. The operation should only be performed by a surgeon.

XI. Gutta Serena.

This is sometimes called glass eye, incorrectly, however, as the term is understood in the West and South. In glass eye, as understood there, the pupil is sound and perfect, the iris distinct and natural, but has a white ring around the cornea. It may injure the sale of a horse, but simply from the singular expression it gives the eye of the animal.

True gutta serena, or *Amaurosis*, is palsy of the nerve of sight, or of the nervous expansion called the retina, and due to functional and organic disease of the optic nerve. In the early stages of the disease it may sometimes be relieved, but is likely to occur again. In the later stages it is incurable.

Causes.—Congestion, tumors, dropsy or other diseases of the brain. Also by injury to the nerve of sight, by pressure or other cause, from inflammation, excess of light, and may be symptomatic, from indigestion or during gestation.

How to know it.—In the early stages the insensibility of sight may be only partial; the pupil will be unnaturally large; upon closing the lids of the eyes, and opening them in a strong light, there will be little or no variation in the pupil; the eyes will be unnaturally clear from extreme dilatation; the animal will be partially or totally blind, as shown by high stepping and failure to flinch when the fingers are suddenly pointed close

to the eye; the ears will be in constant motion as a compensation for the want of sight.

What to do.—If from overloading the stomach, indigestion, gestation, etc., turn the animal upon grass, if in the season; or clothe warmly and feed upon easily digested food, as mashes and roots. If the attack is recent and from such cause as inflammation of the brain, bleed to the extent of a gallon, and put a seton close to the eye. In fact the cause must be found and removed, if it be due to one that can be removed. Success is sometimes had by blistering as for ophthalmy. Use in connection with this nerve stimulants. Of these strychnia, in one to two grain doses, according to circumstances, or five grain doses of nitrate of silver may be given.

EYE AFFECTED BY SERENA.

Sympathetic amaurosis may admit of cure. As we have said, the deranged function must be restored.

If medicine is required to deplete the system the following will be good:

No. 173.
2 Drachms powdered gentian,
4 Drachms powdered aloes,
1 Ounce common salt,
1 Pint warm water.

Give as a drench, and keep the animal on light mashes with an occasional injection of salt and water if necessary.

If there is debility alteratives and tonics will be indicated:

No. 174.
1 Ounce powdered golden seal,
1 Ounce powdered gentian,
1 Ounce powdered sulphur,
1 Ounce powdered ginger,
1 Ounce salt,
1 Pound oatmeal.

Mix, divide into twelve parts and give one in the feed—of good, generous diet—night and morning.

As a lotion for bathing the eye the following is recommended as a good astringent:

No. 175.
1 Ounce powdered bayberry bark,
1 Pint boiling water.

Let it stand until cool. Strain through a close linen cloth, add a table-spoonful of tincture of bloodroot and bathe twice a day.

CHAPTER XIII.

DISEASES OF THE BONES.

I. BIG HEAD AND BIG JAW. —— II. SWEENY OF THE SHOULDER. —— III. SWEENY OF THE HIP. —— IV. BONE SPAVIN. —— V. ENLARGED HOCK. —— VI. RING-BONE. —— VII. STIFLE. —— VIII. SPLINT. —— IX. SORE SHINS (INFLAMMATION OF THE METACARPAL BONE). —— X. ROTTEN BONE. —— XI. INFLAMMATION OF THE KNEE-JOINT. —— XII. CARIES OF THE LOWER-JAW.

I. Big Head and Big Jaw.

Causes.—This disease, called also *exostosis of the bones*, is manifested in an enlargement or bony tumor on the face, on a line between the nostril and the eye. It finally breaks out in small holes, which discharge a thick pus, and at last ends, if not treated opportunely, in a complete decay of the bone. The bone continually enlarges, and cells or channels are formed as the minute bony plates become thinner and thinner, till the structure can be easily cut with a knife or crushed with the fingers. The interstices are filled with a red, bloody mass. In some cases the ligaments and tendons are separated by decomposition of the bone, and crumblings, dislocations and fractures take place for want of firm attachment for these supporting ligaments.

The primary cause of the disorder is not known; but the tendency is believed to be transmitted. A horse manifesting signs of the big head is generally diseased not alone in the bones of the face, but the whole osseous system seems to be to some extent involved, so that there is not infrequently a soreness of the limbs and a lameness accompanying it. The immediate exciting cause is most probably defective nutrition—a want of that power of assimilation which is necessary to the supplying of the bones with their phosphate constituent.

It may be developed by both over-feeding and by deficiency of food, as

the digestive functions are deranged by either excessive burdens imposed upon them or want of sufficient nutrition in that food which *is* digested.

It is difficult to assign any reason why the general predisposition should be determined primarily to the face.

It has been observed to prevail mostly in those regions where Indian corn is constantly fed, and in those, whatever be the predominant food, where the animal uses only, or chiefly, free stone water—a fluid lacking in that phosphate element so essential to bony structures.

Hard labor and abuse, poor food and bad stable management, doubtless do much to precipitate the disease.

How to know it.—Before the visible swelling of the face there will generally be evident weakness, loss of appetite, laziness; a slight suffusion of the eyes with tears—one or both according as one or both sides of the facial bone is affected; then a swelling, about half way between the eye and the nostril, small and hard, but gradually increasing in size. If the swelling is pressed upon with some force the horse will wince with pain, but gentle rubbing seems to give ease. The lower jaw, under the chin, will next appear thickened; a degree of general stiffness sets in; at last the joints are swollen, and seem puffed up with wind; the horse rapidly fails in flesh; and the head becomes enormously swollen, and finally breaks into little openings which discharge an offensive pus.

What to do.—It is well, perhaps, to warn the reader in the outset *not* to do any of those foolish things which characterized the old practice, such as boring into the diseased part and injecting corrosive poison; laying open the jaw and sawing out a portion of the bone; blistering, burning, etc. The disease is not local, but constitutional, and though perhaps having no other visible manifestation than on the face, it has extensive connection with various portions of the frame, so that purely local treatment is of little consequence.

The first step will be to see that the patient is well stabled or otherwise cared for according to the season of the year, and put upon a systematic course of food, drink, and moderate exercise in the sun. Give him from five to seven quarts of oats per day, and if these are boiled and mixed with a little wheat bran, all the better. When green vegetables can be had, they should be fed liberally, to counteract a sort of scorbutic or scurvy tendency which marks this disorder. Apples, beets, carrots, turnips—whatever fruit or vegetable you can get him to take is good. When seasonable, put him upon a bountiful pasture.

Give the following dose night and morning in such food as he will most readily eat:

No. 176.
2 Ounces chlorate of potash,
4 Ounces powdered ginger.
3 Ounces gentian,
2 Ounces podophyllin,
6 Ounces poplar bark.

Give also with the food, once daily, 2 ounces phosphate of lime.

Rub upon the swelled face with moderate vigor, twice daily, the following preparation:

No. 177.
6 Ounces spirits of camphor,
4 Ounces cod liver oil,
2 Ounces oil of cedar,
1 Pint diluted acetic acid.

If the case has been neglected until there are already breaks in the skin, and exudation of matter, adopt the previously described course, with this exception, that the part must be thoroughly cleansed with warm soap and water, and then, instead of No. 177, apply the camphorated corrosive sublimate every other day for six or eight times, then omit three days, and begin again, and so on until the skin shows signs of healing. Apply the sublimate with a little mop of soft rags, and dry it in with a hot iron held near the part, or pressed smoothly over a layer of intervening cloths, thick enough to prevent actual burning.

II. Sweeny of the Shoulder.

The common effect of all lameness and disease of a limb is a wasting of the muscles connected therewith. Therefore in all sprains entailing inflammation and continued disease of a limb, and in all injuries entailing chronic, long-continued manifestations, there will be wasting or atrophy of the muscles, and in extreme cases sometimes permanent contraction, even of the cords of the limb. This is popularly called swinny or sweeny. It is the result of disease and not the disease itself. The cause of this wasting must therefore be looked after in order to obviate the difficulty.

There is, however, from sprain of the muscle outside the shoulder blade, a tendency to waste of the muscles, to such a degree sometimes, that they are so shrunken as to cause the skin to be drawn tight to the shoulder blade.

Causes.—Sweeny is usually acquired by young horses, when first put to work, from over-strain: or, it may occur in horses of any age, from hard pulling on uneven ground, by stepping into holes, etc., thus causing injury to the muscles of the shoulder, and particularly those supporting the joints.

How to know it.—Sometimes the horse may be able to walk or even trot without serious difficulty. If one stand directly in front of him there will be seen that the affected shoulder is held in an unnatural position, seeming to be rolled outward farther than is natural. There will be a peculiar motion in the gait, and heat, tenderness and swelling on the outside of the joint.

What to do.—By pressure on the parts discover the seat of the inflammation by the flinching of the animal. This found, reduce it by continued application of cold water to the part, if in the earlier stages. This may be done by folding a long blanket and hanging over the shoulder so as to cover the affected part. Over this keep a cloth continually wet with cold water, until the acute symptoms have subsided.

After these have subsided, exercise must be given every day, either by driving on a smooth road or using at any light work on smooth ground. Every effort should be made to increase the circulation over the fallen muscles by active rubbing. If the case do not yield to treatment, and there is decided wasting, the muscle being hard, use the following:

No. 178. 1 Pint ammonia,
1 Quart oil.

This should be rubbed in with considerable friction, until nearly the excitement of a blister is produced. This with subsequent friction and an occasional use of the blister, will effect a cure; but it may take months of perseverance to bring the shoulder back to its perfect shape. Light exercise should be given every day.

III. Sweeny of the Hip.

The wasting of the muscles of the hip are due to analagous causes with those of the shoulder. It is, however, far more rare, since the power of the horse being in the hind-quarters, the enormous muscles of those parts act as cushions to protect the parts from injury. As a rule, the cause of the wasting of the muscles of the hip must be looked for lower down, unless the injury is known to proceed from a fall on the side.

A careful examination of all the muscles will enable the owner pretty generally to fix the seat of the disease, from the heat and tenderness of the parts. This discovered, use the means prescribed for shoulder sweeny. In old and difficult cases, either of the shoulder or hip, it may be necessary to resort to active blistering and subsequent stimulation by means of the galvanic battery. In old and confirmed sweeny that has come with a horse bought, or from neglect at the proper time, a cure will probably not be effected; but a partial restoration of the parts may be made.

Sweeny has been placed among the diseases of the bones because it sometimes proceeds from injury to the bones and joints. The difficulty itself, however, is confined to the muscles.

IV. Bone Spavin.

The definition of bone spavin may be given as an inflammation, ulceration and bony deposit of the small flat bones in the lower and inner part of the hock joint; or of both the outer and inner ones, or from inflammation of the cuniform and metatarsal bones, terminating in anchylosis (a bony union of the parts) rendering the joint stiff.

Foot, incapable of being raised from ground by reason of spavin.

Natural position of the healthy foot when raised from the ground during an easy trot

Causes.—Injury to the joint by concussion, sprains of the ligaments, the use of shoes with high heels or calks. Hereditary predisposition to spavin is common from weakness of the joints, bones and ligaments. Consequently weak limbed horses or mares, or those with spavins, or other diseases of the bones should never be bred from.

Bone spavin is really one of the most formidable diseases with which the horseman has to deal, and the attack is sometimes so slow and blind that jockeys are often enabled to put off a spavined horse on the unwary, the horse afterwards going dead lame. Nevertheless it will show itself if the horse is allowed to cool, or is ridden into the water and allowed to stand awhile, for a horse with spavin coming on as he becomes warmed the ligaments become freer in their action, and an animal lame at first, will go well enough afterwards; yet, in the end the horse becomes permanently lame, until the deposit about the bone, called anchylosis, becomes solidified, when the joint is stiff and the lameness ceases.

Causes.—The causes producing spavin may be various. Hereditary weakness of the limbs is undoubtedly one of the principal causes. Thus a blow, a sprain, or any injury producing inflammation will cause spavin in such an animal, when in a strong muscled and fine boned animal it

would yield readily to treatment. The reason is, a feverish and unhealthy condition of the membrane secreting the synovial fluid is produced, and the firm membrane affording no outlet, it settles into the spongy bone, and a diseased condition ensues, which the weight and motion of the animal intensifies until confirmed spavin is the result. When only the splint bone is affected there is chance for recovery, but when the cube bone is affected there is but little chance for relief until the disease has run its course, and ended in a joint more or less stiff.

How to know it.—Sprains do not invariably cause lameness. There may be little or no local swelling as in occult spavin, as ulceration is called, in the center of the joint between the flat bones. The swelling, when it does exist, is in front and on the inside and on the lower part of the joint, and may best be seen by standing about midway of the body so as to get a side view of the front of the hock. When the swelling is in front of the hock it is most to be feared. It is hard and is to be distinguished from the tense but elastic swelling caused by sprain of the flexor tendon, or from the flexible and fluctuating swelling of bog spavin.

The swelling of bone spavin may be more to the front or farther back on the inside of the hock, or even shown principally on the outside, and in case it extends to the true hock joint, it may end in bony formation to such a degree as to close the articulation (play of the parts) and produce a stiff joint. The animal if turned from side to side in the stall will move stiff and on the toe. This same stiffness is also seen when the animal first starts off, but which may nearly or quite disappear when the animal becomes warm. The horse will sometimes jerk up the limb as though he had string-halt. By turning him quickly in a small circle he will carry the limb more or less stiff, or rest on the toe only.

What to do.—In any case rest and a high heeled shoe should be allowed. In the acute stage or early in the development of the disease, place the horse in slings if possible. Foment thoroughly with hot water in which an ounce of laudanum is mixed to each two quarts of water. Give four drachms of aloes if the bowels are costive, and give half an ounce to an ounce of saltpeter in the water, morning and night, until a free flow of urine is had. When the inflammation has subsided blister. The following will be effectual:

No. 179. 1 Part corrosive sublimate.
12 Parts oil of turpentine,

Mix thoroughly and rub in. Firing with a white hot iron is still more effectual, yet the iron and the corrosive liniment are apt to leave a blemish. A milder preparation is:

No. 180. 2 Drachms oil of rosemary,
½ Ounce powdered cantharides,
4 Ounces mercurial ointment.

Grind thoroughly together and rub on heating it in with a warm iron.

If there is simply swelling, in old cases, thorough and frequent rubbing with oleate of mercury will dissipate what swelling has not actually become bone. Setons are also most valuable in spavin. The needle should be passed for a considerable space under the skin, over the seat of spavin. Anoint the tape with the following:

No. 181. 1 Part powdered white hellebore,
8 Parts lard,
Mix with gentle heat.

Before the application of either blister or seton we would advise thrusting a narrow-pointed bistoury under the sprain and scarifying the parts. In no event, however, should resort be had to cutting away the bony parts which have formed, with mallet and chisel, as we have seen them. It is barbarous, inhuman, and can do no good whatever. Some cases will absolutely resist all and any means for cure; others again will yield kindly in from one to three months. In young horses if treatment be given in time, a cure may generally be effected. With old horses the cure is difficult.

V. Enlargement of the Hock.

Nature has protected the hocks in a most ample manner, to prevent injury under ordinary circumstances, and in fact, under exceptional circumstances, except those of an accidental or violent nature. From various bruises or strains, inflammation and lameness may ensue. Rest and fomentations will generally set this right if taken early. Sometimes, however, the enlargement will continue to grow in spite of all efforts to the contrary, and until the entire joint is involved.

How to know it.—There are two forms of this disease. In one, the tendons and cartilages only are affected. This will generally yield to fomentations and a few applications of oleate of mercury. If not, blister, using the prescription No. 180. Another form is more serious. From a severe blow or other cause, there is a bruise of the bone, by which the investing membrane, called the periosteum, is either severely strained or torn loose, giving rise to inflammation and formation and deposit of bony matter on the surface of the bone, sometimes to such a degree that the parts are of excessive size, and the leg so lame that it is only with great difficulty the animal can walk. The animal may, indeed, as in the case

of bad spavin, be capable of doing farm work even with a stiff leg, but is totally unfit for driving on the road.

What to do.—Precisely the same treatment must be pursued as in the case of bone spavin. Fomentations, while in the stage of fever or inflammation, and blistering, firing and setons to assist absorption. It must be remembered, however, that either in spavin, or any other disease of the bones, joints, cartilages, or muscular tissues, that straining of the parts is likely to ensue again, and consequently care must be taken about overworking or injuring by fast driving, especially on rough ground.

VI. Ring-bone.

This is a deposit of bony matter above and below the coronet of the foot, just where the hair begins above the hoof, or of the bone of the hoof, as the coffin bone is called, or bony growth on the pasterns.

Causes.—It is caused by heavy work, hard pulling by draft horses, bruises of the bone by pounding of the feet on hard roads and pavements, generally beginning as inflammation of the membranes covering the bones, and at those points giving attachments to the ligaments at the side of the lower or small pastern bone, or of the lower end of the upper or large pastern. Sometimes the bony formation proceeds to such an extent, involving and covering the whole surface, as to produce a kind of club foot.

How to know it.—There may be lameness or not, except on hard ground, or upon binding the limb, in old-seated ring-bones. During the beginning of the evil, or while there is inflammation, and a tender, elastic swelling, and a more or less doughy state (engorgement) of the soft parts. In the course of the disease this matter becomes hard, from being turned into a soft or spongy bony formation. The swelling may be scarcely seen and confined to the sides of the pastern bone, or there may be great enlargement of the whole surface. If the trouble occurs in a fore-leg, the heel is put down first; if the ring-bone is in the hind-foot, and in the sides or back part of the pastern, the toe will be put down first.

What to do.—For the fore-foot, put on a thin-heeled bar shoe. If in the hind-foot, a high-heeled shoe. That is, if the animal walks on the toe, use a high-heeled shoe; if on the heel, a thin-heeled shoe. If there is inflammation, known by heat and tenderness, use fomentations of hot water, perseveringly applied until it is reduced. Then blister severely with the following:

No. 182. 10 Drops muriatic acid,
20 Grains corrosive sublimate,
20 Grains camphor,
1 Ounce oil of turpentine.

Mix, and apply until a sufficient blister is formed: then wash off to prevent blemish and keep the blister running as long as possible, by covering with a rag well smeared with mutton tallow. Blister again if necessary. Or, use the means pursued in spavin, oleate of mercury, if the case is not difficult.

If the ring-bone has been of long standing, the only relief will be the growth of bony matter over the joint. There will be more or less stiffness in the joint, but the horse may do slow work. Old horses are more difficult to cure than young ones, and in any case to avoid blemish, the case must be taken at the first indication. Then thorough fomentations, slight blistering, a proper shoe and rest will accomplish a cure. If there is simply a hardening of the integuments, oleate of mercury, in developed ring-bone or spavin, will reduce so much of it as is not already bony growth.

VII. Stifle.

Any difficulty of the stifle joint, by which the animal is more or less disabled from the use of the limb, is by the generality of horsemen termed stifling, it being supposed to be a dislocation of the stifle bone, corresponding to the knee-pan in man. Dislocation, however, is extremely rare. The displacement of the whirlbone of the stifle joint when it occurs, will cause the animal to throw the limb straight out behind. This form often becomes chronic; that is, occurs, and the habit is fixed from apparently slight causes, or any cause that shall compel the animal to throw the leg back farther than is usual in going at a slow gait. It is often produced in the first place by catching the hind leg or hoof in something which forcibly holds it.

How to know it.—The horse will hold the leg extended out behind; the head will be raised and the animal will go on three legs; there is every evidence of extreme pain, but no heat nor swelling. Upon examining the stifle bone, the patella, corresponding to the knee pan in man, will be found outside those against which it should fit. When the dislocation is inward, the limb will be drawn upward.

What to do.—Get the animal into a close place; have him held firmly by the head; pass a rope about the fetlock and over any projection, so the limb may be drawn forward. Bring the limb forward and upward, and standing behind and against the hip, press the bone toward and into

its place. Hold it there firmly until the muscles regain their original contractibility in some measure, and use an infusion of bayberry or oak bark, cold, freely, for some days.

In addition to this it is better that the horse be made to stand on the injured limb. To do this it is usual to tie a cord tightly about the other hind leg. This is apt to make a blemish. Tie the other foot so it cannot be thrown back.

In nine cases out of ten when the owner supposes his horse to be stifled the difficulty will be found to be from injury to some other part of the limb, as sprain of any of the ligaments of the leg, of the fetlock, a prick of the hoof, etc., causing the animal to hold the limb in such a way as to cause the stifle bone to seem displaced.

Horses often injure the parts around the stifle joint by running, leaping, or from bruises or other hurts. In this case the treatment is to be the same as in any other sprain or bruise. In mild cases the following will be found good to bathe the sprain or bruise with:

No. 183. 1 Ounce tincture of arnica,
1 Pint rain water.

Bathe the affected part freely with this from time to time. If the difficulty is severe, fomentations of hot water must be perseveringly used until the inflammation subsides, and then resort may be had to blistering if necessary, or a seton may be placed under the affected part to get up counter irritation. In severe cases the cure is slow and the animal must have absolute rest.

In any difficulty in or about the stifle joint, it is well to examine carefully for wounds or bruises.

A wound of the parts will often cause intense pain, and to the uninitiated, apparently all the symptoms of dislocation. The veterinarian is never deceived, and no one need be if he brings common sense and a careful examination to bear upon any wound, bruise, strain or other injury. There will be blood, matter, swelling or heat in the part affected. This found, use the remedies prescribed in such cases.

VIII. Splint.

Causes.—The name is given to a peculiar enlargement generally found on the outside of the small bones of the fore leg, and inside the leg. The causes are not well defined. Splint may be caused by violent blows or other injuries, but it seems to be more a consequence of weight and strain. The inner splint bone, or small bone of the leg, is placed nearer the center of the body than the other, and there is at almost all times greater weight upon it, while on certain occasions it may also be subjected

to more violent strain, whence inflammation may set in, and a bony deposit result. Raising the outer heel of the shoe more than ordinarily, contributes in some degree to produce an unnatural strain upon this bone. The term splint is applied also to those bony tumors that sometimes appear on the outer shank bone. These are more readily accounted for, as this part of the leg is peculiarly liable to blows and other injuries.

How to know it.—In the first stage of the disease, while the splint is forming, there is inflammation of the periosteum or bone-covering membrane; there is lameness; and though no swelling may yet be visible, you can discover it by passing the open hand down the side of the leg, with the thumb on the small bone, or rather in the groove formed by the two small bones. A small, hard swelling will be found, which, being pressed upon, will cause the animal to flinch.

When the tumor is well-developed and plain to the sight, it is not generally attended with lameness, from the fact that the periosteum has accommodated itself to the new formation, and the inflammation, with consequent soreness, has subsided. Then it happens that a very little splint will often cause more lameness than one which is so large as to be easily seen at a distance.

In cases of much inflammation and extreme soreness, the horse stands resting the toe upon the ground, with the leg slightly bent; and this great heat may extend itself by sympathy to the soft parts of the leg nearest the splint, but this is seldom the case.

Sometimes the animal is apparently free from all trouble when merely put to a walk, but will discover extreme lameness in trotting—the extra concussion producing much pain, and examination, as previously directed, will disclose the seat of the trouble.

What to do.—If the protuberance is small, and there is no lameness, do nothing, unless the horse is valuable and the tumor is unsightly. It will disappear by natural absorption as the animal increases in years, provided there is no directly exciting cause constantly at work. An unskillful attempt to cure will sometimes lead to lameness and an increase of the splint.

If it is a recent formation, and treatment is thought necessary, observe whether the irritation is such as to have produced extreme tenderness of the part, and swelling of the soft parts of the leg. If so, lessen the inflammation, and thus also the soreness, by cool, softening poultices, or frequent application of cold salt and water. Then shave the hair off from over and around the protuberance, and rub in, at evening, the following mercurial ointment:

No. 184. 1 Drachm biniodide of mercury,
1 Ounce lard.

Continue this until a free watery discharge is produced from the surface. As a general rule this is sufficient, for even though it may not directly disappear, it will gradually do so from this time, unless the tumor interferes materially with the ligaments or tendons.

If it is large, or near the joint, or extends so as to destroy the motion that naturally exists between the two small bones, cast the horse, and secure him from violent struggling—then scarify the periosteum or membrane covering the bone, over the splint. For this purpose, have a small, probe-like knife, shaped like a scimiter, with the cutting edge on the convex side. Make a small opening about an inch below the splint, turn the little probe knife flat and insert it into this opening and urge it forward until the point has passed over the protuberance. Now turn the cutting edge down, and scarify the periosteum well, making several cuts across the splint, and with such force as to reach the naked bone every time. Withdraw the knife and insert a seton needle, with tape fixed as usual; pass the point up past the splint, send it through the skin, and draw the tape through. Slightly enlarge the upper end of the tape, so that it cannot come out below, and the work is done. Suppuration will ensue in from seven to fourteen days; absorption will follow, and the splint will almost invariably disappear.

During treatment the horse should be kept from work, as any considerable exercise, particularly any straining in harness, or concussion by rapid motion, will increase lameness and render cure more tedious and difficult.

IX. Sore Shins—Inflammation of the Metacarpal Bones.

This is an inflammation of the membrane covering the shank bones, and is not confined to any particular classes of horses, though racing or other fast worked horses are more subject to the affection than are draft horses, the difficulty generally occurring before the animal becomes mature.

Causes.—The cause is undoubtedly over-working and abuse before the bones and integuments become fully developed.

How to know it.—The lameness resembles that of splint. There is swelling over the shin bone, which is tense as though stretched, elastic, and doughy to the touch. There is heat and tenderness, and sometimes the swelling becomes excessive, and breaks, but always preserves its elastic feeling. Or the swelling may not be extensive, but gradually hardens through the formation of bony matter, until at length the pain disappears.

In these slight cases, the matter thrown out between the bone and membrane, is generally converted into a bony formation and the skin remains permanently thickened. In severe cases the throwing out of

matter (lymph) may separate the membrane and the bone, and eventuate in necrosis, or death of the bone.

What to do.—If the difficulty is not severe, cold water faithfully applied during the inflammatory stage, and later, blisters, will be all that will be necessary. In fact, treat it precisely as is recommended for splint.

In very severe cases, where there is great tenderness, and decided doughy swelling, make a series of incisions with a bistoury or narrow-bladed knife, carrying the blade a short way beneath the skin, and then cutting down to the bone. This is done to let the contents escape. Use as a fomentation hot water containing half an ounce to an ounce of laudanum to a pint, and afterwards with cold water. If the healing is not prompt, apply a blister. In a majority of cases it should yield by applying the following astringent lotion:

No. 185. 60 Drops carbolic acid,
½ Ounce sugar of lead,
2 Quarts rainwater.

It may be necessary, in fact it will be better, to give a purgative, 4 or 5 drachms of aloes, to be followed by 20 drops tincture of aconite, three or four times a day. The animal should have perfect rest and be kept on sound hay and bran mashes.

X. Rotten Bone.

This is called necrosis when it attacks the shaft or body of the horse, and caries when it is confined to the ends at its joints.

Causes.—Death and decay of the bone, from inflammation. It is liable to occur in poll-evil, founder, from cracked or broken bones, and inflammation of the membranes.

How to know it.—There will be severe inflammation, followed by one or more abscesses, which break and discharge. They do not heal, but form fistulas (pipes). The discharge at first may be thin and without smell, but after a time there is a peculiar and fetid odor, characteristic of decayed bone.

What to do.—The proper thing to do is to cut down at once to the decayed bone, scrape it clean, remove all loose portions, wash the wound with chloride of zinc lotion, made as follows:

No. 186. 40 Grains chloride of zinc,
1 Ounce distilled water.

The wound made in cutting is to be treated as is any wound. If the

cutting be extensive enough to warrant it close with stitches, cover with lint steeped in oil to which a little carbolic acid is added. If healing do not progress satisfactorily, that is if the granulations at the edges do not contract fast enough, stimulate by washing with tincture of aloes and myrrh. So far as this cutting and scarifying is concerned it should be done by a surgeon. If this cannot be done, open the fistulas clear to the bottom and wash out once a day with the following:

No. 187. ½ Ounce sulphate of zinc,
½ Ounce sulphate of copper,
1 Ounce solution of sub-acetate of lead,
6 Ounces pyroligeous acid, (or better, white wine vinegar).

To one part of this use ten parts of water, and inject with force from a syringe once a day for two weeks if necessary.

XI. Inflammation of the Knee-joint.

Inflammation of the knee or other joints may occur in all stages, from the most simple form to those most violent, with ulceration, and the formation of destructive abscesses.

Causes.—Jarring on hard roads; various injuries, such as bruises, strains, etc.

How to know it.—In light cases the horse in starting forward will do so from the knee and with pain. There will be excessive flinching if the knee is extended by force. The animal stands square on his feet, and without inclination to raise the heel. In walking he takes a fair step, but carries the knee joint as much without bending as possible, and in putting down his foot exerts the greatest pressure on the heel.

What to do.—Take off the shoes. Treat the inflammation as directed in other cases; first by hot water embrocations perseveringly applied, using laudanum as directed if necessary to relieve pain. There must be perfect rest, and if the animal will use the limb put him in slings, and apply splints and bandages to the knee. The inflammation having been cured, blister the parts, to promote absorption of the fluids. When the animal is better let him have the run of a quiet pasture until entirely sound, or keep him in the stable with gentle walking exercise every day.

XII. Caries of the Lower-jaw.

Causes.—Caries, or ulceration of the lower jaw bone, between the tushes and grinders, is caused almost wholly by the barbarous use of bits and curb-chains. Injury is also sometimes inflicted upon the bony plate of the roof of the mouth by pressure of the curb, when a tight nose

band keeps the mouth shut down. The gums of the lower jaw are very often hurt, and not infrequently the bone itself is so bruised as to result in this ulceration. When this is the case, the gum, unless forcibly opened, must slough, so that the injured portion of the bone can be cast off. Thus a stinking sore is made, and one of long continuance, as the scaling of the bone and the escape of the loosened particles is a tedious process.

How to know it.—Examination of the gums is necessary to disclose the trouble when it exists simply as a bruise. The spot will appear of a color different from the adjacent parts, and pressure upon it will cause the animal to wince with pain. Even if neglected till there is a discharging sore, it is not always detected at once, as the discharge is, in the beginning, of a watery character, and is lost in the saliva, though constantly going on. On contact with the bit, however, there is a mixture of blood and watery matter, and some of this escapes constantly while the horse is in use. This ought to attract the attention of the master, if nothing else has, and lead to thorough examination. There will be found, in that case, a depression in the gum, and, fixed to the bottom of the cavity, a mass of proud flesh. The discharge will be characterized by a very offensive stench.

What to do.—If the bruised place on the gum, accompanied with sensitiveness to pressure, is discovered before there is any break or exudation of matter, have a strong, keen knife, and cut to the bone. The incision made ought to correspond with the extent of the bruised bone. The grating of the knife upon this sore portion will cause the horse to struggle with more or less violence, owing to the exceeding soreness and tenderness of the injured part; and this may in some sort furnish a guide as to the amount of incision necessary. If the opening is too small for the scaled bone to be easily cast out, it will be necessary to employ the bone forceps with which to grasp and withdraw it.

Upon cutting it, a thin, watery fluid will flow out. Care must now be taken to see that the incision is not allowed to close over and retain the injured bone, as this would ultimately result in a foul and troublesome ulcer.

When the discharge has somewhat thickened, and is peculiarly offensive to the smell, showing that the bone is decaying and that nature is making an effort to cast off the injured portion, wash it out with the syringe, several times a day, with the following solution:

No. 188.
1 Scruple chloride of zinc,
4 Drachms essence of anise seed,
1 Pint water.

If treatment is deferred, however, till there is an open, ulcerous gum, with the existence of proud flesh, push a stick of lunar caustic deep into the unhealthy granulation in the cavity, so as to destroy it. Then keep down the fungous growth by the use of the caustic, day after day, until the stinking discharge has ceased. This will not be until the bone has ceased to scale away; and the wound may now be safely left to heal.

A cure affected, the next thing to do is to select a bit that shall press upon another part of the mouth, or there may be a repetition of the evil. The snaffle may be used with comparative safety where the curb has inflicted serious hurt.

CHAPTER XIV.

DISEASES OF THE FEET.

I. ULCERATION OF THE FOOT (NAVICULAR DISEASE). —— II. CRACKED HOOFS.——III. HOOF ROT.—— IV. CORNS. —— V. CONTRACTION OF THE HOOF (NARROW HEEL).——VI. INJURIES TO THE FROG.——VII. FOUNDER. —— VIII. NAIL PRICKING. —— IX. CANKER.——X. SAND CRACK.——XI. FALSE QUARTER. —— XII. QUITTOR. —— XIII. TOE CRACK.——XIV. PUMICE FOOT.——XV. SEEDY TOE.——XVI. OSSIFIED CARTILAGES.——XVII. SIDE BONES. ——XVIII. INCISED AND PUNCTURED WOUNDS OF THE SOLE.

I. Ulceration of the Foot—(Navicular Disease).

Between the coffin bone and lower pastern there is a small bone which forms the projection of the heel and rests upon the frog of the foot. This bone is called the shuttle or navicular bone. The inflammation of the surface of this bone is called the navicular disease. It may implicate the synovial sac, the ligaments and the flexor tendon which plays over it. One of the uses of the navicular bone is to give increased strength to the connection between the coffin bone and the joint above. Another use is to enable the flexor tendon, which passes over it and is joined to the coffin bone, to give increased pliability, strength and motion to the foot. In high bred horses, and all those used for fast work, this bone is peculiarly liable to injury and consequently to disease. This disease is inflammation and subsequent ulceration of this highly organized bone. The difficulty may extend to the interior of the bone, to the tendon which passes over its surface and even involve the adjacent parts.

Causes.—It is thought that a rheumatic constitution predisposes an animal to this disease. Certain it is that highly organized and weak limbed animals most usually suffer from it, probably from the fact that they are not able to withstand an injury that a stronger limbed animal would do, especially when carrying a bad fitting shoe, or subject to violent exertion or over strain of any kind. Other causes than bad shoes

and concussion of the bone may exist, injury from nails picked up on the road, impaired nutrition, by which the bones are not sufficiently nourished acting to assist injury to the bone.

How to know it.—The foot will feel hot, yet particular heat is not always present. The toe will be pointed, in the stable, eight or ten inches before the other, and with the heel slightly raised. This peculiarity may indeed be noticed often for a long time before any particular lameness is noticed. By-and-by the animal will be observed to step short, and on the toe, with liability to stumble when first taken out of the stable. This will disappear as the animal gets warm, but will show again when cool. The toe of the shoe will become more worn than other parts. As the disease progresses the hoof will decrease in size, particularly in the quarters and heels. Trying the edges of the hoofs will not make the animal flinch unless there be corns, but by tapping the sole on each side of the body of the frog with a hammer, or upon the walls of the hoof about the quarters, will give pain. By bending the foot back and pressing with the thumb in the hollow of the heel on either side of the flexor tendon, with considerable force, it will cause intense pain. These are all characteristic tests. There may be sweeny of the shoulder from disease of the muscles. This is an effect of the disease and not a disease in itself.

What to do.—If the injury is new, the first thing to be done is to reduce the inflammation. Do this with cold water applications or any of the remedies advised for ring-bone, spavin, or other inflammation. Give in laxative dose, 4 drachms of aloes; have the shoes taken off and let the horse stand during the day time in pure wet clay up to the top of the hoof, and at night poultice the foot. If there is much inflammation, bleed in the arteries above the coronet. The coronet is the lowest part of the pastern, where the hair grows around the hoof. Keep the horse perfectly quiet, and if he has a fast pulse, give an ounce of salt petre in the drinking water night and morning. At the end of two weeks, or sooner if the inflammation is gone, blister the coronet all around. Or, use the following:

No. 189. 1 Ounce camphor gum,
1 Ounce corrosive sublimate,
1 Pint oil turpentine

Grind the sublimate thoroughly in a mortar, and put into a strong bottle; pour on the turpentine and shake occasionally. It should be fit for use in from 20 to 30 hours. This is to be applied every other day to the heel and bottom of the foot, first paring away all scaly, ragged parts.

Heat it in with a hot iron. This preparation is of great strength and power and must be used carefully.

If preferred, a seton may be put in the bottom of the foot at the frog. To do this, first pare the scale as thin as possible without reaching the quick; provide a sharp, short, well-curved needle threaded with tape; pierce the sole about an inch from the toe, and bring out midway between the two parts of the frog and the hollow of the heel; or enter at the hollow of the heel and bring out the needle at the body of the frog. The utmost care must be had not to pierce deep enough to injure the tendon or bursa which lies close there. Tie the tape, and wet daily with No. 189, or the following:

No. 190. 1 Part powdered cantharides,
1 Part oil of turpentine,
8 Parts Canada balsam.

Shake the two first well together and add the balsam, shaking occasionally for 24 hours, and apply to the seton tape every day, turning it at the same time. The object in this disease is to produce suppurative running of the parts. This done, the cure is only a question of time.

If, in spite of all that has been done for relief, the disease proceeds to degeneration of the bone, resort must be had to cutting the nerves leading to the foot, (Neurotomy) which will be described in the proper chapter.

II. Cracked Hoofs.

Causes.—This is not an unusual occurrence in horses, and arises, as a rule, from weak and brittle hoofs, produced by a dry state of the hoof, whatever may be the cause, whether fever or other causes of degeneration. The prolific causes are drying of the wall of the hoof, uneven bearing of the shoe, calking or other wounds or injuries of the coronet. This crack may extend down from the coronet according to the time it is allowed to run.

CLOSING CRACK IN HOOF.

What to do.—If taken early, a bar shoe, having an even bearing all round will generally relieve the difficulty. In connection with this, apply a plaster of pitch over the injury.

If the crack becomes determined, as in the cut given, it must be kept

closed together by clinching a thin nail on each side of the gap near the bottom and top, or else with thin wire as shown in the cut.

Also burn a groove just below the crack about an inch long nearly down to the quick. It is also well to slightly blister the coronet at the top of crack. An efficient and stimulating liniment will be the oil of cantharides, made as follows:

No. 191. 1 Ounce powdered cantharides,
8 Ounces olive oil.

Mix in a strong bottle and set it in water kept near the boiling heat for three or four hours, and filter through close linen. Apply once a day with friction until the part is tender. Let the horse have rest, or turn into a pasture until cured.

III. Hoof Rot.

This difficulty, sometimes called tender feet, arises from diseases of various kinds, spavin, ring bone, chronic founder, navicular disease. There is a dry, feverish state of all the parts, and the hoof, and especially the sole, becomes decayed and sometimes perishes entirely.

How to know it.—The bottom of the hoof is dry and chalk-like, so that it may easily be dug away with the point of a knife, or even easily scraped away. The frog of the foot diminishes in size, and the ankle joints are apt to swell. The horse steps short and goes lame, if in one foot, or if in both, cripples in his gait. The affected foot will be pointed forward to enable the animal to rest on the sound foot, or if both are affected, first one and then the other will be placed forward. Sweeny or wasting of the muscles of the leg and shoulder result simply from disease of the limb.

What to do.—Remove the shoe, pare away all unsound portions of the hoof until all the pumiced parts are got rid of; also the frog and the sides of the hoof. Stimulate the bottom of the hoof by washing with No. 189 once a day for three days, heating it in with a hot iron. Then omit for two or three days and commence again. During the treatment the animal must be kept in the stable and the feet should be kept dry. When hoof rot is due to other diseases, as ulceration of the navicular joints, it will do no good to follow the rule laid down until the cause of the difficulty is removed.

IV. Corns.

Corns are in very many cases the result of other diseases, tending to weakening of the sole rather than the result of a bruise to a sound hoof.

Thus a horse with corns should be thoroughly examined for injury to the bones of the hoof, rotten hoof, etc.

Causes.—A bruise on the sole below the bars and the wall at the heel, producing a horny tumor or hardening, which presses on the quick. Sometimes there is inflammation, owing to the formation of matter which works out either at the top of the hoof or at the toe, from the formation of a fistula. Then it is Quittor. They may be found on either side of the heel, but usually on the inner or weaker side.

How to know it.—There will be flinching when the walls of the hoof and sole are seized and strained with the pincers; thus revealing on which side and the locality of the corn. The toe will be pointed, when at rest, and with the heel slightly raised. In motion the gait will be short and stumbling. If it has proceeded to suppuration, the pain will be so extreme that the horse will fear to put the foot to the ground. If there is a horny tumor forming, it may be known upon paring the hoof by the appearance of a white, spongy, horny formation, as in sand crack.

What to do.—If the corns proceed from other disease, causing contraction and other disabilities of the hoof, remove these causes and the corns will disappear. If the corns proceed from a simple and recent bruise, remove the shoe and rasp down the bearing surface of the heels, so there may be no pressure. That is, the heels should be rasped lower than the other bearing surfaces. If there is inflammation, let the hoofs rest in cold water, or keep them moist with a wet cloth and the sole with a soft sponge, or the whole hoof may be enveloped in a large sponge cut to fit. The animal should wear a bar shoe, arranged to avoid pressure on the parts affected. When the foot ceases to be tender, keep the hoof and sole smeared with the following ointment, to render it soft and promote healthy growth:

No. 192. ½ Ounce tallow,
1 Ounce oil of turpentine,
4 Ounces beeswax.

Use the horse at light work until entirely recovered.

If the difficulty be found to be a suppurating corn (one containing matter), the hoof must be cut down to let all the matter escape: cut away all the horn that has become separated from the quick, and pare away all the horn around the parts to a thin edge. Poultice the part with a linseed poultice, renewed until there is no longer tenderness, and the surface is smooth and healthy. Then put on a bar shoe with a leather sole, and fill the space from behind with tar held in place with a

stuffing of tow. Give entire rest and no pressure on the heel until the sole of the foot has grown out naturally.

If the corn has become a tumor it should be cut out, and the same treatment pursued as advised for a corn that has formed matter.

Old corns sometimes result in disorganization of the parts, or death of a portion of the heel, disease of the bone of the foot, or ulceration of the cartilage. In this case they must be treated as advised for Quittor or for navicular disease.

V. Contraction of the Hoof, Narrow Heel.

In a healthy condition the hoof of a horse should be nearly round. Whatever shape the hoof may assume, it is not a disease in itself but the result of disease or of some disability. It is generally the result of fever in the feet from injury to bones, ligaments or frog, or the effect of founder, etc. Contraction of the hoof exists in nearly all diseases of the feet, and may occur from standing idle in the stable. So it may result from undue paring of the heels, the bars on the frog, from a shoe remaining on so long that the foot is prevented from taking its natural growth.

What to do.—The only thing is to remove the shoes and round the edges of the hoofs to prevent their being broken or split, and keep the affected hoofs standing every day from early in the morning until late at night in puddled clay reaching well up the hoofs. Continue this for two, three, or four weeks as the case may be. Then use prescription No. 192 as a hoof ointment until the hoof is brought back to its natural shape as near as may be. In shoeing let the shoe be without bevel on its upper side, and let the bearing be equal on all parts of the wall of the hoof.

VI. Injuries of the Frog.

The frog of the horse's foot is especially liable to injury from being bruised upon projecting stones, pierced by nails and splinters. It is also liable to inflammation of the secreting membrane, resulting in the formation of matter, and to canker.

What to do.—In all bruises with soreness pare away the frog carefully until the difficulty is found. If bruised, treat it by using the liniment No. 189. If pierced with some sharp substance extract it and inject tincture of aloes and myrrh. If the difficulty be thrush, caused by exposure to wet and filth, bruise of the frog, hard substance lodged in the cleft, or other cause, there will be soreness of the skin behind the cleft

of the frog, and a bad smelling discharge from the cleft with more or less lameness.

Wash the affected parts thoroughly. Cut away all ragged surfaces and press into the cleft or wound dry calomel, or finely powdered sulphate of copper.

VII. Founder.

Founder, or inflammation of the feet, called by veterinarians laminitis, consists in fever, inflammation of the sensitive parts of the foot, including the laminæ, and of the foot bone, but is most severe in the forward portion, where greatest strain occurs when standing. Acute inflammation of the foot, or founder, differs but little in its physical manifestations from other inflammatory symptoms, except that it seems more complete and permanent. Acute founder is generally produced by overwork or overheating and exhaustion and sudden cooling, while the sub-acute form may be the result of diseases of the respiratory organs, suddenly leaving those parts and manifesting itself in the extremities.

Causes.—The disease may be brought about directly from hard work on dry, solid roads, and consequent strain on the laminæ (scale of the bones), from over-feeding or drinking cold water when warm, especially when the predisposing cause already exists. So it may be brought about by other diseases, as inflammation of the lungs. Heavy, fat horses are especially predisposed to founder, and so are those with small and deformed or large, flat feet.

ACUTE FEVER IN THE FEET.

How to know it.—There will be general fever and stiffness, and soreness; there may or may not be shivering. Soon extreme tenderness of the feet follows, generally most severe in the forward part, but soon in the heel; the pulse is strong, full and rapid; the breathing quickened,

with dilated nostrils; the intensity of the pain will often cause the animal to groan and to break out into a sweat. If pushed backward the horse will elevate the toes and throw his weight on the heels by a peculiar motion. The hoof and frog will be hot and very sensitive to pressure, and the arteries of the pasterns will beat with violence.

When the inflammation is in the hind feet, the fore feet are carried as far under the body as possible to support the weight, while the hind feet are thrown forward to bring the weight upon the heels. In either case, the animal will often lie stretched out for hours to relieve the intense pain of the feet.

Founder has sometimes been mistaken for a disease called myositis, an inflammation of the *muscles* of the limbs, especially of the hind quarters and loins. They should never be so mistaken, as an observation of the several symptoms will show.

Founder.—First one foot and then the other is lifted from the ground.

Lying down lessens the pain and the fever of the feet.

The difficulty usually occurs in the fore feet.

Myositis.—Both feet are kept on the ground with refusal to move either.

The animal will not lie down, and if thrown down the pain is increased.

Generally in the hind quarters.

In many cases the symptoms are not so aggravated as we have shown, but the symptoms, whether one or more of the feet are affected, are the same, and often, especially when repeated attacks have been suffered, leave the animal with seedy toe, pumiced feet, corrugated and otherwise distorted hoofs, and always more or less liable to recurrence of stiff spells during life.

What to do.—In light cases, when discovered early, clothe the animal warmly, give twenty drops of tincture of aconite every two hours, preceded by a gentle laxative, say

No. 193. 2 to 3 Drachms powdered aloes,
1 Ounce bicarbonate of soda.

Mix in a pint of water and give as a drench. If there is severe pain give ounce doses of laudanum every hour until an effect is produced.

As an application to the feet keep them in large warm poultices of linseed meal and water, or let the feet be placed in water kept as hot as the animal can bear. Put him in slings by all means, if they can be procured. Have the shoes carefully taken off as soon as the sedatives given will allow him to bear the pain. As early as possible the animal should be bled in the veins above the coronets of the affected feet. The bleeding will be assisted by the feet being placed in hot water, and for this reason, if for no other, the slings should be used as quickly as possible.

If there is much thirst make the drink slightly sour with cream of tartar. If at the end of two days the fever and tenderness does not get better pare down the soles and open them at the toe to let out any watery matter that may exist, for fear the horn may separate from the quick, keeping on the poultices afterwards as before. When the inflammation subsides blister the pasterns and apply the corrosive liniment No. 189 to the soles of the feet, and keep the horse standing on soft clay, or if in Summer time turn him into a moist, soft pasture.

As a rule, neither bleeding from the neck or active purging should be allowed in founder. There are, however, cases occasionally in simple founder, from overfeeding when tired, or giving cold water when warm, when a gallon of blood taken from the neck and an active purge of a quart of linseed oil has acted like a charm, the patient recovering almost immediately. In this the operator must be guided by circumstances. If the horse is fat and full of blood it will tend to reduce the inflammation by drawing the blood to another part of the system. If so the blood should be allowed to flow in a full stream.

VIII. Nail Pricking.

The prick of a nail in shoeing, or from having a nail enter the foot in traveling often leads to the most serious consequences if allowed to proceed, such as ulceration, ending in quittor and other disabilities. An animal being lame without swelling, inflammation or other indication of strain or bruise, the feet should be carefully examined, and the nail or other substance be cut out, at whatever pains it may take. Then dress the parts with hot pitch, cover with tow and give the animal rest for a few days.

IX Canker.

This is one of the diseases that may arise from the prick of a nail or bruise. Again it may occur without apparent cause.

How to know it.—It is a disease most prevalent in heavy, coarse-boned horses. The frog will become large, spongy, and covered with a fungous growth of a cheesy texture, and throwing out an abundant colorless, bad smelling fluid. If cut away it will again quickly spring into growth. The discharge is more offensive than in thrush, and the disease more obstinate, often resisting treatment for a long time.

What to do.—The horse must be kept in a clean, dry, well-ventilated stable. All diseased portions of the hoof must be carefully pared off so far as the knife may be able. The cure consists in destroying the fun-

goid granulations. Thus in cutting do not be alarmed at the sight of blood from the canker. Over the well portion of the hoof spread the following:

No. 194. 4 Grains chloride of zinc,
1 Ounce flour.
Mix, and apply dry.

Cover the diseased parts with the following:

No. 195. ½ Ounce chloride of zinc,
4 Ounces flour.

Tack on the shoe lightly, pad the parts within the shoe well, and secure good pressure by cross pieces driven firmly within the shoe. The second day after remove the shoe and padding, cut away everything that appears to be in a sloughing condition; repeat the dressing every two days until the parts are sound. As soundness begins to appear in portions of the surface, dress these with the following; that is, when fungoid granulations have ceased to sprout:

No. 196. 2 Grains chloride of zinc,
1 Ounce flour.

As the canker improves, the dressings may be extended to the third or fourth day, and during the whole time of treatment the horse should be liberally fed, and be exercised gently for four hours every day.

X. Sand Crack.

These are of two kinds, quarter crack, occurring in the inner quarter of the fore foot, and toe crack, occurring in the toe of the hind foot, both being cracks and fissures in the walls of the hoofs, beginning at the coronet and extending downwards.

Causes.—Defective quality of the hoof, causing brittleness; bad shoeing, or splitting of the hoofs from hard driving on solid roads.

How to know it.—When the horse leans his weight on the hoof, the crack will open; when the foot is lifted the crack will close. Sand and dirt work into the parts, causing excessive pain and lameness, often fever and the formation of matter.

What to do.—In recent cases, before there is much inflammation, all that will be necessary to do will be to remove the shoe, cleanse the crack thoroughly, cutting into it if there is dirt or sand lodged inside, drawing the hoof together closely again, by the means of two thin clinch horse shoe nails, one at top and one at the bottom, and filling with the following composition·

No. 197. ½ Ounce tallow,
1 Ounce oil of turpentine,
2 Ounces resin,
4 Ounces beeswax.

Melt together, and fill the crack with it quite warm, and let it cool. The foot should be protected so no dirt can enter, and the horse turned to pasture until a new hoof is grown, placing a bar shoe on the injured hoof.

If the crack is an older one, and there is inflammation, the edges must be pared and the fissure sufficiently laid bare so it may be thoroughly cleansed of all grit and dirt. The crack must then be thoroughly fomented to reduce the inflammation, and poulticed until it assumes a healthy appearance. The parts must then be brought firmly together by means of clinch nails; covered with ointment, No. 197; a bar shoe put on, and a new hoof allowed to grow.

XI. False Quarter.

This difficulty differs materially from sand crack, inasmuch as it is a deficiency in the growth of the horn of the hoof extending from the coronet to the sole. It is a gap in the wall of the hoof rather than a crack.

Causes.—It is produced from a deficient secretion of the horn making power, owing to previous quittor, frostbite or other injury to the coronet.

What to do.—The principal means to be used is careful shoeing with a bar shoe. If the injury has been recent, stimulate the coronet with a mild blister, or if there is a wound, cut the edges with a knife and dress with weak carbolic acid water, to induce a healthy growth of horn. In old cases, all that can be done is to fill the fissure with gutta percha, and protect the weak hoof with a bar shoe.

XII. Quittor.

Causes.—This fistulous condition of the fibrous cartilage of the foot—inflamed, suppurating, penetrated by canals in various directions, with openings upon the quarters and heels of the coronet—is caused by pricks in shoeing, by threads, by suppurating corns or bruises, by neglected bad tread or over-reach, by neglected thrush, by irritation from sand-crack and false-quarters, by bruised sole that sometimes takes place when flat-footed horses are ridden over stony ground; in short, by any injury which leads to inflammation of the cartilage of the hoof and the formation of pus inside. When the sensitive portion of the foot is pierced by a nail, or when inflammation has followed a bruise, suppuration speedily

follows, and the accumulating matter presses in every direction, and, finding no ready outlet, the little fleshy plates of the coffin bone are forced from the horny ones of the crust, or it may burrow between the horny and fleshy sole, and far towards the very central portion of the foot. Pipes and sinuses are then made in every direction; but the outlet is generally by abscess of the coronet, or that portion of the hairy skin running immediately down upon the hoof.

How to know it.—A recent wound or ordinary abscess of the coronet may be mistaken by the inexperienced for quittor, especially if any lameness attends it; but a little examination will readily disclose the true nature of the case. From a simple wound, there is not apt to be a fetid discharge of so unwholesome a character as that which oozes from the sinuses of the quittor, and the parts must be more or less swollen, and yielding to pressure, whereas, in quittor, the surrounding tissue is hard, though it has taken on a peculiarly unhealthy action, and probing with the flexible probe, or *bougie*, will discover the presence of a sinus or of sinuses, of more or less depth. There is almost always lameness, which is sometimes excessive, and of a halting character: the coronet is somewhat swelled into a ridge around the top of the hoof, and about the center of which one or more small orifices are found, that discharge in small quantities an offensive matter—sometimes rather thin and watery, again, thick and having a curdled appearance. The probe, as we have said, will disclose sinuses, and these generally tend downward into the foot. The quantity of matter discharged is often very small at first, so much so as to be out of all proportion to the very serious nature of the trouble, and the difficulty attending a cure. Even when the opening or openings will scarcely admit the small *bougie*, there may be much matter, and this may have penetrated under the cartilages and ligaments, and to the coffin-joint itself. Wherever it has gone, it has formed fistulous pipes, or ulcerations that are difficult to heal. There is usually increased heat, as well as much tenderness of the foot.

What to do.—The first step is to discover, if possible, the cause; and if this is still operating, to make every effort in your power to remove it. Sometimes there is such swelling around the hoof, and such excessive tenderness, that the animal cannot bear to have the foot handled except in the gentlest manner. In this case, apply a good softening and cooling poultice, and keep him as still as possible—renewing the poultice as often as it begins to grow dry and hot—until the inflammation is something reduced, and the extreme tenderness overcome. Then, remove the shoe and withdraw every nail if it can be done. If the trouble has been caused by a nail, and the nail can be removed, there is already something

of a dependent opening made by which the accumulated pus may escape, and this opening may be enlarged by farther paring away the hoof, so as to reach the softer part, that can be more readily cut with a keen knife.

A small probe, or *bougie*, should be inserted from above, and worked to the lowest depth of the sinus. If this extends far towards the base of the foot, the prime object should be to get an opening from below to meet it, no matter what may have been the cause—whether a prick, a bruise, or irritation caused by other foot diseases. This dependent opening established and kept open, the pus will in time be evacuated, and the foot will return to its healthy state, unless the joints have been attacked, in which case a cure is scarcely to be hoped for.

If the disease is of long standing, the internal surface of the sinus or sinuses has become more or less callous, and a stimulating lotion must be injected with a syringe every day, composed of one drachm chloride of zinc to one pint of water—increasing the chloride gradually to two drachms.

This treatment will suffice. The main trouble, however, is to make the dependent outlet. In case this cannot be done, owing to the shallowness of the sinuses from above, reduce the inflammation by poulticing, as previously directed, and then inject this somewhat caustic solution into each channel or pipe:

No. 198. 5 Grains bichloride of mercury,
1 Ounce spirits of wine,
20 Drops muriatic acid.

Do this three times the first day, twice the second day, and once a day subsequently. When the discharge has ceased, stop the injection, and simply keep clean by the use of warm soap suds, used as often as necessary.

If it is found impracticable to inject this solution into the openings, adopt this instead: Insert, by means of a wet probe, a mixture of corrosive sublimate and flour (three parts of flour to one of corrosive sublimate). Persevere until you know that every part of the sinuses has felt the caustic. In two or three days thereafter they will begin to discharge a white, curd-like matter. It may be necessary to repeat this, but if thoroughly done, and there is no affection of the joints, a cure may be expected.

Sometimes the trouble rises from a gravel having insinuated itself between the shoe and the sole, and creating a bruise or corn. This may be ascertained by removing the shoe and seeking for a spot unnatural in appearance, hot, and tender on the sole. If found, it ought to be pared down so as to reach the more sensitive part of the foot, and, if possible, to discover and liberate matter.

In making examinations preliminary to treatment, the greatest care should always be exercised, as the treatment, to be successful, must be specially adapted to the exigencies of the case. It sometimes happens that the trouble is critical, and that only an experienced practitioner ought to be intrusted with it. When the probe indicates that the direction of the sinuses is backward, the chances are in favor of recovery; but if it shows the direction to be forward, the important and complicated parts of the foot are in danger, and the result of even the best treatment is doubtful.

In any event, a complete cure requires much time, and a more than ordinary exercise of patience and care.

If the patient, in moving about, strikes the swollen parts above the fore-foot with the toe of the hind-foot, or if he hurts it in lying down, some steps ought to be taken to obviate these additional causes of irritation and pain.

If the general health of the animal is scrupulously attended to, it will materially assist in the management of the local disorder.

XIII. Toe Crack.

A hoof with crack in the toe should be treated precisely as though the difficulty occurred in another portion of the wall of the hoof. The difficulty in all cracks of the hoof, is the difficulty in healing, for the reason that when the animal steps, especially on uneven ground, the walls are strained apart. In sand-cracks, the principal care must be to extirpate the grit and dirt, whatever the amount of paring and cutting it may take. If granulations appear, they must be cut out. Then wash with a solution of chloride of zinc, made as follows:

No. 199. 1 Grain chloride of zinc,
1 Ounce of water.

Whatever the quantity made, let it be in this proportion. Cleanse the whole interior of the crack fully. In cutting away the hoof, it should present an oval shape when finished, the points at top and bottom.

Having cleansed the inner portions, if the crack does not extend completely from the coronet to the toe, with a firing iron, just hot enough to cause the horn to smoke, the iron not at a red, but at a black heat, soften the crust and continue the cutting until the diseased portion is all exposed. If granulations (proud flesh) show, cut it out and let the parts bleed. Then continue the application of the chloride of zinc lotion three times a day until a healthy reaction is produced. The crack may then be stopped with pitch or tar and tow, or gutta percha; a bar shoe put

on with two clips in front to hold the parts together, and the animal kept in a clean, soft pasture until a new hoof is grown. An examination of the parts being made from time to time to see that no grit or foreign substance has entered to increase the difficulty.

Sand-cracks, quarter-cracks, and false-quarters, will require time to ensure full recovery, and the time so consumed should not be grudged.

XIV. Pumice Foot.

Pumice foot, the effect of chronic laminitis, is an excessive growth of soft, spongy horn in place of the healthy hoof, forming rings running together at the toe, causing a bulging at that point and a depression above. This growth in front of the lamina of the toe separates the coffin bone from the wall of the hoof, and allows the bone to press upon the sole and even to pierce through it. Thus the sole becomes convex instead of concave, the animal becoming groggy, and in time quite crippled. This state is almost entirely confined to animals with flat feet and weak limbs, weak and brittle crusts to the feet, with large and prominent frogs.

What to do.—In bad cases there can be no cure. Much may be done to alleviate distress, and enable the horse to do slow work, especially on the farm. Put on a thick, broad webbed bar shoe, a dished shoe having the web hollowed out, or beveled toward the inner side on the upper surface and thinned down from the toe to the heel. It is better that the shoe be also assisted with a bearing of leather next the sole.

The hoof should be smeared daily with equal parts of glycerine and tar. If heated in slightly so much the better. The sole should also have the same application. Apply a mild blister to the coronet from time to time to stimulate action, and turn the horse into a soft, damp pasture. Thus in time a fairly smooth hoof may be grown, but it can never be expected to be entirely sound.

XV. Seedy Toe.

The wall of the foot is composed of two layers, the outer one darker, harder and thinner than the inside one; the inner layer thicker, softer and lighter in color than the outer. The outside layer is secreted by the coronet, the inner one from the sensitive lamina. In health these are intimately united, forming the thick, tough, elastic hoof, capable of bearing the shocks of the body in traveling.

Causes.—If from any cause, inherent weakness, undue shocks, disintegrating the laminæ, or other cause, the separation begins at the toe, just as in the human nail the separation begins at the margin—it produces seedy toe.

How to know it.—If a seedy toe be struck with a hammer it will give a hollow sound, showing that it is disunited. Remove the shoe and a separation will be found between the two coats of the hoof.

What to do.—Find the extent of the separation with a thin probe. Cut away such portions of the crust as may be disunited, and to where there is firm adhesion of the parts. If there is a powdery substance clean it out. Keep the cavity filled with warm tar, properly held in place, and shoe so as to give a uniform bearing, and support the weak part with a clip if necessary. This dressing must be repeated from time to time as required, until the cavity is entirely filled with a new and healthy growth.

XVI. Ossified Cartilages.

Ossification of the cartilages is sometimes called false ring-bone. It is a disease to which many horses are sometimes subject, and often exists in connection with ring-bone and side-bones.

Causes.—Jarring, by hard driving over rough roads, or pounding on hard pavements, or any of the causes producing ring-bone or inflammation of the parts.

How to know it.—When the difficulty is new, there may be fever in the parts. Later there will be more or less enlargement of the back of the coronet and the heel, the parts feeling hard, irregular or lumpy. The horse is not always lame, but if driven over hard roads, the horse will show soreness and travel short after cooling off.

What to do.—In old standing cases, but little can be done; rubbing the parts with oleate of mercury will reduce so much as is not already bony substance. In connection with this put in a seton under the affected part. In more recent cases, if there is heat, bleeding from the foot will give relief. Then apply cloths dipped in cold water to every quart of which has been added a half pint of tincture of arnica. The inflammation being reduced, apply repeated dressings of biniodide of mercury. This will promote absorption, but a complete cure may not be expected.

XVII. Side Bones.

Side-bones are ossifications from the heels of the coffin-bone into the lateral cartilages. In heavy horses, side-bones may occur in connection with ring-bones. In fact, ring-bone has its seat in the *os suffraginis*, and side-bone in the parts about; the first being in the pastern; the latter lower, or about the coffin-bone.

How to know it.—The enlargement is just above the coronet and immediately below, when ring-bone exists. Side-bone may be found at the back and lateral parts of the coronet. There will be more or less soreness and lameness, but after ossification bony formation of the parts has been completed, the joint is either stiff or nearly so.

What to do.—The treatment should be precisely identical with that prescribed for ring-bone.

XVIII. Incised and Punctured Wounds of the Sole.

Incised wounds are those made with a sharp instrument; punctured ones are those made with a blunt one, as a nail. If the cut be a clean one, all that will be necessary to do will be to pare away the sides to be sure that no foreign substance is lodged there; wash out with tincture of aloes and myrrh, and keep the wound closed with tar and tow, and give rest until healed.

If the difficulty be from a nail, care must be taken that it is all extracted. This must be done at whatever cost of cutting. Then dress as prescribed for the incised wound. In old cases, where suppuration has taken place, the matter must be let out by enlarging the orifice. Then the same means for cure may be adopted as in quittor or other maturated sores.

CHAPTER XV.

WOUNDS AND INJURIES AND THEIR RESULTS.

I. STRAINS AND SPRAINS.—II. OVER-REACH.—III. BRUISING, OR SPEEDY CUT.—IV. BROKEN KNEES.—V. CAPPED ELBOW.—VI. FROST BITE.—VII. BURNS AND SCALDS.—VIII. RUPTURE.—IX. CHOKING.—X. WOUNDS PENETRATING THE ABDOMINAL CAVITY.—XI. CONTUSED WOUNDS.—XII. LACERATED WOUNDS.—XIII. PUNCTURED WOUNDS.—XIV. BROKEN HOCK.—XV. DISLOCATIONS.—XVI. VARIOUS FRACTURES. XVII. VARIOUS DISTORTIONS.—XVIII. DISEASES OF THE EAR.

I. Strains and Sprains.

In the human subject, a strain is simply a wrench, by which a fiber, a ligament or tendon is stretched beyond its proper capacity, and followed by pain, lameness, and inflammation of the parts.

A sprain is an incomplete luxation (dislocation) in connection with stretching, with more or less laceration of the ligaments of a joint, and even rupture of the tendon. In veterinary practice the word strain is used. It is far more difficult to handle than in man, and for the reason that it is often difficult to prevent an animal from using the parts.

Replacement of the parts as near as may be, and rest, are the surest means of cure. Therefore in every case the intelligent horseman will use the best means to ensure this; consequently it will be simply necessary to lay down certain rules of guidance to be followed.

Strain of a joint.—In a joint that is easily flexed, (moved back and forth) the parts should be held firmly by means of a starch bandage, if there has been sufficient stretching to produce loss of continuity.

How to make a starch bandage.—Provide a long strip of strong unbleached muslin, and of a width proportioned to the part injured. Soak this in strong starch, and bind on while wet, making a half turn of the cloth in passing about the limb, so it will form a figure eight. Allow

this to dry without movement and it will hold the parts firm. If the strain occurs in the fetlock, hock, or knee, this will be indicated. For a lighter strain, a simple cold water bandage will suffice.

In all strains, rest must be given, the diet should be light but wholesome, and if the bowels become costive, they must be stimulated to action by alterative medicines. Strains of the ligaments or muscles must be met with cold water bandages. In all strains, however, dependence in the early stage must be upon arnica, equal parts of the tincture and rain water. Bathe the parts thoroughly and carefully two or three times a day, and then apply the cold water bandage, keeping it wet.

If the strain is in the shoulder or loin, lay a wet blanket over the part affected, and cover with a dry one, changing as often as may be necessary. Sponge the affected parts with the diluted tincture of arnica, as before recommended.

This, with rest, a light diet, keeping the bowels regular, and an ounce of cream of tartar to the bucket of water, ought to subdue any curable case of strain.

II. Over-reach.

Causes.—A tired horse, especially when going at a fast pace, sometimes fails to lift the fore feet quick enough. The result is the inner part of the hind foot strikes the outer side of the coronet of the fore foot, or higher, often producing a severely lacerated or contused wound.

What to do.—The only remedy is to clip the torn portions away, and keep the parts washed with chloride of zinc, (No. 195), first cleansing the parts with water if at all dirty. The healing must take place through the sloughing of the torn parts, and by granulation. If slight, tincture of arnica will be sufficient as a lotion. Treads from calking may receive the same general treatment.

III. Brushing, or Speedy Cut.

This is a bruise, abrasion of the skin, or contused wound, produced by the shoe of one foot striking the opposite fetlock ankle, or even the knee. It is more owing to weakness than other causes, though a horse striking once is more liable to the same injury thereafter. It is really the foot that is resting on the ground that causes the hurt, from its being put down out of the proper line.

What to do.—For horses of slow or moderate driving, the difficulty is confined to striking the ankle and below. The usual remedy is to cause the horse to set his foot in proper line by raising that side of the shoe, thus throwing the inside of the ankle slightly up. Any common sense

blacksmith should know how to do it. For fast horses, the limbs must be further protected by means of pads and other appliances to be found at all saddlery establishments.

IV. Broken Knees.

This is a common disability of stumbling horses, and of saddle horses kept for riding, leaping, or hunting. A horse with the scars of broken knees should never be used as a saddle horse, unless it can be clearly shown that the hurt was done accidentally in leaping upon a foul landing place.

What to do.—The first thing to do is to find the extent of the injury. It may be that it is only a slight bruise with or without abrasion of the skin. In this case, using the tincture of arnica two or three times a day, and a cold water bandage, if there is heat, should ensure recovery.

Sometimes, however, there is an ugly, lacerated wound filled with dirt and gravel. In this case the parts must be well washed by repeatedly filling a large sponge with clean, warm water, and squeezing it dry against the limb above the hurt. Never, under any circumstances, put it against the hurt. It only soils the sponge and presses the particles of dirt farther into the wound. If there is a sac below the cut containing dirt it must be carefully probed, and opened from the bottom with a keen, sharp pointed knife. The object is that no grit may remain in the wound to prevent its healing. A seton should be tied so the sac may be emptied of its contents in the process of suppuration. If the granulations become soft and flabby, showing proud flesh, they must be touched with nitrate of silver. In three days after the establishment of suppuration the seton may be withdrawn. The wounded parts must be kept wet with cold arnica water, the proper proportions being one ounce tincture of arnica to each pint of water used.

Copious suppuration having been fairly established, discontinue the use of the arnica, and use instead the lotion made by dissolving in each ounce of water used a grain of chloride of zinc. Use no bandages. Cleanliness of the parts is necessary. These means should carry the knee to a favorable issue.

Sometimes, however, the injury is so severe that the ligaments and even the joint is injured. It then becomes a most serious case. In this event the animal must be put into slings, the joint brought together, after being thoroughly cleansed as before stated, the parts must be bandaged and astringent washes used to promote the uniting of the parts, while the same general treatment is pursued with the laceration as advised before. In case the injury be so severe as to involve the joint, if a veterinary

surgeon cannot be had with proper appliances for caring for the horse he had better be killed at once.

Besides injury to the knee by falling, it is sometimes injured by having some sharp substance driven forcibly into the ligaments or even between the joints. These should be carefully looked for and removed, since old running sores, fistulas and other disabilities may result, completely destroying the usefulness of the animal. Joints other than the knee may be similarly injured. If so, the general treatment should be the same. First reduce the inflammation, and then use means for cure. In ordinary cases, as a healing agent, in wounds, either lacerated or contused, we have never found anything better for promoting healthy granulation or healing of the parts than a free use of tincture of aloes and myrrh.

V. Capped Elbow.

Causes.—This tumor at the back point of the elbow is generally caused by a bruise inflicted by the calkings of the shoe while the horse has slept with his legs doubled up under him. Inflammation of the sub-cellular tissue is established, and that condition sets in which gives rise to enlargements by increased deposit near the part. The tumor is circumscribed, being confined to the elbow, but it sometimes grows to an enormous size, and hangs loosely from the back point of the elbow, and interferes with its action.

It may be produced also by long heels, as well as calkins, by striking with the shod hind foot, by a blow, and by lying on uneven surfaces.

How to know it.—A slight swelling of the point of the elbow is first perceived, and unless the cause is removed this will gradually develop into a large-sized tumor. When of any considerable size, it will contain serum, or a watery matter, and has a fluctuating feeling to the fingers. This fluid is contained in tough, fibrous walls, and may remain for a long time, or it may at last be absorbed, and leave a hard tumor. At this stage there will of course be no fluctuation.

What to do.—If discovered in its early stage, and serum is evidently present, let it out by opening the sac at the lower edge with a keen knife, or a thumb lancet. Press upon it so as thoroughly to remove the fluid. Then, with a small rubber syringe, inject a mixture of equal parts of pyroligneous acid and water. Next, moisten it externally, morning and night, with the camphorated corrosive sublimate, No. 2, which will have the better effect if dried in at once with a hot iron held near. Before the horse is allowed to lie down again, make a soft pad, covered with chamois skin, without a seam on the outer side, of such thickness as to keep the shoe from striking the elbow when the leg is doubled under him,

and tie it securely round the pastern. This should be on every night; and even after cure is effected it will be necessary for the animal to wear this pad, to prevent recurrence of the bruise, or else to have the shoe shortened. The pad must be at least two and a half inches thick.

If it is in its new state (a simple swelling without matter), it can be assuaged by using frequently, at moderate intervals, some cooling lotion.

If large, watery, somewhat pendant, and unsightly, have an experienced surgeon remove it entirely; and then dress as an ordinary wound.

If, after it has been opened, and the fluid pressed out, it heals with hard substance left behind, rub frequently with acetate of mercury until the natural state is restored.

If treatment is undertaken only when there is no watery matter, no fluctuation, remove it absolutely by making a vertical slit, of sufficient length, and dissect the lump; after which treat the wound with simple cerate, or any healing ointment.

Care must always be taken to guard against having the elbow injured again while treatment is going on, and to prevent rebruising the part after cure is effected.

If there is constipation or otherwise feverish tendency in the animal, the cure of tumors or other local troubles will always be more difficult unless this tendency is removed by suitable purgatives and carefully regulated diet.

VI. Frost Bite.

Injury from the effects of frost is more common in the North and West than is generally supposed, and in many cases rheumatism, founder and other "stiff complaints" may undoubtedly be attributed to this as the predisposing cause.

Causes.—Long exposure to cold, either standing in the open air or confined in cold stables; standing in half melted snow and slush; keeping young animals in exposed yards, where they cannot take exercise and with insufficient food.

How to know it.—The skin of the injured parts in light cases, turns purple, inflames, cracks and exudes a bloody serum; or if severe, the skin and tissues beneath lose color, and become dead and eventually shrivel. The skin, particularly of the heel, will crack, often from one side to the other, refusing to heal.

What to do.—If the limbs are simply chilled, friction will be all that is necessary. If actually frozen, the animal should be warmly clothed and the frozen parts be rubbed with snow until circulation is partly restored. Then put the parts in cold water and continue rubbing until

warmth and circulation are entirely restored. Then dry thoroughly with cloths and hard rubbing.

If the frosting has been neglected and raw sores make their appearance, prepare the following:

No. 200. 2 Drachms belladonna,
1 Ounce petroleum,
1 Ounce lard.

Rub the whole thoroughly together, and apply twice a day to the raw or ulcerated places. If this does not promote recovery, and decided ulcers occur, add to the above prescription 2 ounces red oxide of mercury. Rub all well together and apply once a day to the ulcerous parts.

VII. Burns and Scalds.

Burns and scalds seldom occur in horses kept on the farm or employed on the road. They are, however, of frequent occurrence when horses are employed about mills or factories where steam is used; or in iron foundries and in cities.

What to do.—One of the best and most easily obtained applications, for a fresh burn or scald, is to dredge bicarbonate of soda, common baking soda, thickly on the part, or moisten with water into a thick paste and bind it or lay it over the injury. For slight burns, which sometimes cover a large surface, there is nothing better than several coats of thick white lead paint laid on with a brush; cover the whole with cotton and bind on close.

Strong alum water is also an excellent remedy for fresh burns and scalds, the proportions being 2 ounces of powdered alum to each pint of rain-water. Keep the parts well soaked with it, and wet cloths saturated with the same constantly over the surface.

Sometimes indolent sores follow burns and scalds. If so, the ulcers should be well and carefully washed with tar water, and the following mixture dusted over the parts:

No. 201. 1 Ounce oxide of zinc,
2 Ounces powdered starch.

Mix intimately and dredge on thickly to form a crust. Wherever the moisture appears through, keep adding the mixture until the crust becomes permanent and fixed.

VIII. Rupture.

Rupture or burst (Hernia) is the displacement of an internal organ

through an opening, either natural or otherwise. The rupture most commonly seen is of the bowels and omentum. The omentum is the membranous covering of the bowels or the caul. The bowels may pass through the caul by rupture, or the bowels and involved caul may, it is possible, pass through the mesentary, the membrane retaining the intestines in their proper position.

If the rupture is into the chest, it is called diaphramatic, and may occur from a violent shock, as in leaping, or in 'bucking,' as jumping stiff-legged is called. In bad cases death is sudden from suffocation. In the slight forms there may only be difficulty of breathing, with lifting of the flanks, as observed in heaves. The only remedial means to be used are to give anodynes and rest. Thus slight cases may at length take on the chronic form, but will never be cured.

Hernia of the mesentary and omentum is difficult to know, and no remedy can avail, except rest, with anodynes if there is pain.

Naval rupture, and that through the scrotum, is most common. The only means of cure in naval rupture is where pressure can be had by means of a bandage or truss and taken in the earlier stages. The intestine must first be carefully pressed back and pressure made over the parts by means of a soft pad, securely fastened, and to be worn until the orifice is closed or at least permanently contracted. Of course an animal with rupture of any part is not capable of violent exertion.

Rupture of the scrotum is also common in males. In cases of colic in entire animals, an examination should be made for scrotal rupture, since there may be colickey symptoms. There may be a swelling of the bag containing the testicle, the contents being movable, and disappearing upon pressure. In the smaller animals, castration may be employed, the gut returned and the wound sewed up.

Ventral hernia is known by the contents being movable and gurgling, and easily pressed back to their place. If recent, the animal should be thrown on its back, using ether or chloral to keep quiet, returning the protrusion, padding the orifice, and covering with strong factory muslin wound round the abdomen and laced along the back, the bandage being kept in place by bands fastened in front and carried to a collar worn on the neck. Except in the case of valuable animals, treatment scarcely pays, unless a veterinarian can be employed who understands anatomy.

IX. Choking.

Choking occurs in two distinct forms. The high choke, when the substance is lodged in the throat or neck; and the low choke, when the substance is lodged in that part of the gullet lying low down within the

chest. In high choke, the animal may die in a few minutes; in low choke, there is not such special need of haste.

How to know it.—There is intense distress; the head is raised; there is slavering, violent coughing and continual efforts to swallow.

What to do.—Examine carefully the furrow on the left side of the neck for the substance. If solid, endeavor to press it upwards with the fingers on each side. If not, endeavor to extract it by putting a balling iron into the mouth to hold it open; pull out the tongue; pass the hand into the throat and endeavor to dislodge it with the finger, the head being held out in a straight line with the neck. If this do not succeed, and the obstruction is in the gullet and is clear of the windpipe, procure a probang, oil it thoroughly, cast the horse, put the balling iron in the mouth, introduce the probang and by steady pressure for a few seconds at a time, endeavor to move it. If it moves continue the pressure until it is pushed into the stomach.

If the substance is so firmly held that the probang will not move it, the mass must be cut down upon and taken out. Let an assistant press the off side of the neck to get as much bulge as possible. Then with a bold cut of a sharp knife, cut through skin, tissues and gullet, to the mass, with an ample cut, and remove; bring the edges of the gullet together, stitch them with fine catgut, or strong silk, and then the wound in the skin. The difficulty here may cause subsequent stricture of the gullet, which may thereafter prevent the animal swallowing solid food. In any event only semi-liquid food should be given for ten days after choking, or until the animal seems well.

In desperate cases, where there is instant danger of death from choking, tracheotomy must be employed. This is cutting into the windpipe and inserting a breathing tube and will be treated in its appropriate place.

THE LOW CHOKE.—This is where the obstruction is low in the gullet, or in the thoracic portion of the œsophagus.

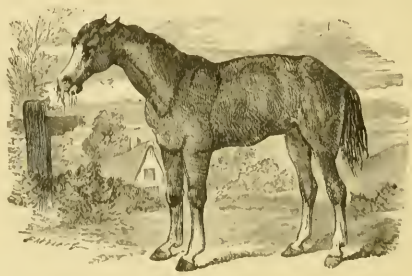
In this form there is great distress but the head is not held so high; saliva runs from the mouth, and the discharge is copious from the nose; if the animal attempts to drink, the water is cast forth from the nose; the breathing is laborious, the flanks tucked up, the back roached, and the animal shows symptoms of general distress.

What to do.—Give a gill of linseed oil or lard oil once an hour, and between these doses every hour the following anti-spasmodic:

No. 202. 2 Ounces sulphuric ether,
2 Ounces laudanum,
½ Pint water.

Use the probang carefully after each anti-spasmodic. If the whole of

the dose is apparently returned, administer chloroform from a sponge, by inhalation, until entire insensibility is produced. Then extend the head, insert the probang, well oiled, and use steady but constant pressure, until the substance moves. It may take ten to fifteen minutes, or more. When the substance moves do not use much violent pressure, but move it carefully until it enters the stomach, care being taken not to force the instrument too far and thus wound that organ, remembering always that sudden violence may bring on spasmodic action, in which case efforts must cease. Violence may also rupture the œsophagus.



THE LOW CHOKE

X Wounds Penetrating the Abdominal Cavity.

A penetrating wound of the walls of the abdomen is generally followed by protrusion of the bowels. Sometimes it is so extensive as to allow a large portion of the intestines to escape. If so, they should be supported by a sheet fastened over the back to prevent injury by the feet and the admission of dirt until relief is given.

What to do.—The horse should be cast, the bowels washed with tepid water, the horse turned partly on his back, the intestines properly returned to their place by pressure, and the wound sewed up with catgut, well soaked in warm oil, and at intervals of an inch apart, bringing the edges nicely together. Then encircle the belly with a strong bandage properly fastened, by being laced along the back. Empty the rectum, if necessary, by means of injections of warm water or soap suds, and keep the bowels open by feeding scalded shorts pretty well salted.

XI. Contused Wounds

A contused wound is one occasioned by injury from some blunt instru-

ment, as a hook, wagon shaft, or other similar medium. They often leave a gaping wound with torn and bruised edges.

What to do.—Clip away all torn and bruised flesh that present ragged edges. If the injury is not extensive all that will be necessary will be to keep the bowels of the animal in health, and moderately loose, with bran mashes, using the following lotion daily. This is known as the compound tincture of aloes and myrrh and should be kept in every stable as a dressing for wounds, galls and other injuries of that nature. It is made as follows:

No. 203. 4 Ounces myrrh,
4 Ounces benzoin,
4 Ounces of catechu,
8 Ounces pulverized aloes,
1 Gallon Jamaica rum.

Mix, keep in a warm place for two weeks, frequently shaking it, and filter through linen. If the wound assumes an unhealthy character, wash with water in which a little carbolic acid is mixed. When granulations appear, if pus, matter, forms, wash daily with a syringe and warm water, and use the carbolic acid wash for dressing, or, if the wound is in such a place that it may be done, cover with tow saturated with the wash. If the granulations are soft, flabby and projecting, showing proud flesh, touch them with a stick of lunar caustic, and expose to the air until dry. Then dress as before directed.

XII. Lacerated Wounds.

A lacerated wound is a torn wound. The wound by treading, calking, is a lacerated wound. The tearing up of the skin and sub-cellular tissues, leaving a flap, is a lacerated wound.

What to do.—In any wound, if feverish symptoms occur, give an ounce of pulverized saltpeter in the drink night and morning, and administer a moderate purge, unless the bowels are open, say 1 ounces of aloes.

In the case of any lacerated wound, if extensive, clip away all torn shreds, bring the edges nicely together and sew them with fine catgut, or white waxed silk, and let the subsequent treatment be as directed for other wounds.

XIII. Punctured Wound.

A nail, the point of a fork, a splinter of wood, a thorn, or any similar substance, makes a punctured wound. They are the most dangerous of wounds, from danger of internal poisoning, or ending in fistula, lock-jaw, etc.

What to do.—First, examine carefully by means of a probe for any foreign substance lodged inside. If so, remove it, even if a clean cut has to be made. A clean cut is not dangerous unless an artery is severed. If the instrument inflicting the wound was dirty or rusty, syringe the wound thoroughly with weak carbolic water. If the wound heals kindly, use the tincture of myrrh dressing, No. 203. If inflammation sets in, and matter forms in a deep, narrow wound, it may be necessary to enlarge the opening to let out the pus. Then treat as directed for contused or lacerated wounds.

XIV. Broken Hock.

MANNER OF USING SETON NEEDLE.

This is a term applied to a severe injury—breaking the cap of the hock. The only treatment is absolute rest, the application of sedatives as lotions, laudanum equal parts with water, to remove pain, and astringents—white oak bark. It is sometimes necessary to blister near the part to get up counter irritation, or put in a seton below the hurt. The mode of using a fixed seton needle, to bring a wound together, in sewing, where a proper crooked, flat needle is not at hand, is here shown. It will also serve to show the manner of using a needle for a seton, to be threaded with white tape.

XV. Dislocations.

Dislocations in the horse are rare, and when they occur are difficult to manage, except with the aid of a veterinary surgeon. Dislocation of the lower joints, and of the hip, is most common, from catching the foot, twisting and pulling thereon to get free. In fact, dislocation of the hip is scarcely ever seen except in connection with fracture, but is sometimes met with in lean, under-fed, young cattle and horses. Dislocation of the shoulder is most seldom met with.

What to do.—In any case of dislocation the first thing to do is to put the joint in place, not always an easy matter. The means we have indicated for dislocation of the stifle will serve to show the manner of operation. A veterinary surgeon should be employed if possible in any case of dislocation. If such cannot be had, any humane surgeon should be willing to give advice as to how to operate. The means to be employed are so different, varying with each particular case, that it would be impossible to state them except in a general way.

If inflammation and considerable swelling has set in before the hurt is discovered this must be first reduced by cold water applications, or better, hot water fomentations, if persistently applied. Then the joint must be brought to place by traction and force. If there is no inflammation this will not be difficult.

When a starch bandage may be employed, this should always be used to hold the parts together. If not the dislocation must be splintered or padded, or both, to keep the parts intact and in place. The slings should always be employed to rest the horse when they may be had. This with cooling lotions to subdue inflammation, rest, proper care and feeding, will ensure recovery in the end. A bad dislocation, however, usually leaves the horse out of condition for anything but farm or slow work.

XVI. Various Fractures.

To fracture a limb completely, so the leg hangs loose, is of so serious a nature, in the horse, that unless in the case of a very valuable animal for breeding purposes it had better be killed at once. In very many cases, however, one of the bones of the leg is fractured or split part way, though the horse may not exhibit extreme pain, may even travel upon it. Softening, however, sets in, and sometime after, in getting up in the stable, the bone gives way entirely. So the fibula, as the smaller bone of the leg is called, may be fractured. If there is lameness after falling in harness, or from a blow, with tenderness, it is safe to treat for fracture.

What to do.—Place the horse in the slings and splinter the limb, first having applied a starch bandage, when it may be made to act. All that will be necessary further will be to feed and water regularly, keep the bowels naturally open, reduce inflammation and soreness by the use of arnica, and trust to time for a cure. A month or six weeks ought to so strengthen the bone that the animal can eat grass, or be fed in a box stall until recovery is perfected.

XVII. Various Distortions.

A distortion arising from fracture or from any chronic difficulty cannot be cured. In case of severe recent strain of the ligaments of the neck, by which the head is thrown to one side, and held so, the neck should be brought straight, splintered, and held so until the ligaments recover their normal tone. Poll evil often leaves the animal with a stiff neck, producing a distorted manner of holding the head. Distortions are often produced by injuries of various kinds. These must be attended to during the cure of the superinducing cause. Distortions often occur in young animals, as knuckling, turning the fetlocks from weakness, etc. The

remedy is starch bandages and splints. Distortions of the tail by which it is curved awry, are remedied by wholly or partially severing the tendons which are constricted or drawn. This, however, should never be attempted by one who does not understand the anatomy of the parts, else mischief may be done. As a rule, however, any distortion, except it be old and chronic, may be cured by taking proper measures, splintering, bandaging, and the use of fomentations where relaxation is necessary. These means the intelligence of the operator will readily suggest.

XVIII. Diseases of the Ear.

Causes.—Injuries to the ear are generally caused by brutal treatment. Twitching them, nipping and pulling upon them with the blacksmith's plyers, and blows upon the head with cudgels, sometimes result in troublesome bruises, ulcers and tumors that close the auditory passage.

Deafness may be an organic defect, or it may be the effect of some disease which has disordered the head, and, by sympathy, the auditory nerve; and the sense of hearing is no doubt dulled by old age, even when the horse may have been well used and reasonably free from disease; but it results in most cases from pulling the ears, cutting or clipping either them or the surrounding skin to remedy supposed defects, and from beating upon the head.

Sometimes scabby or mangy eruptions make their appearance upon the tips of the ears and spread downward, covering them entirely; but this is most probably the accompaniment of some general skin disease.

How to know it—The cuts, breaks in the skin, or sutures, that result from pulling, pinching, and twitching are readily discernible, as are also the ulcers or suppurating sores in which they sometimes end. When the tendons which sustain the ear in its upright position are broken, there is no difficulty in perceiving it, as the ear drops down and flaps about with the motions of the head and neck.

Running sores, similar to the poll-evil, sometimes result, but these may be distinguished from that disease by their being confined more closely to the ear, either inside or out.

When deafness is suspected, an examination of the internal ear will be necessary; and if the swollen parts or ulcers are not perceptible, some artifice must be resorted to to find whether the hearing is actually destroyed. Deafness may be only temporary, as is sometimes the case with man, and the matter can be decided only by making a series of examinations.

What to do.—A simple laceration of the skin, and even of the cartilage, if small, will require no special attention; but if it is so great that the

edges do not come in contact, they must be brought together and sewed, after which the trouble will soon be over.

But it occasionally happens that ulceration of the skin and cellular tissue and a rotting away of the cartilage sets in. This is past all remedy, and necessitates the cutting away of the ear.

When there has been no laceration of the skin, and a tumor is forming, apply camphorated corrosive sublimate, No. 2, occasionally, till it entirely subsides; but if matter seems already forming, apply May-apple liniment, made by taking one gallon of May-apple roots and boiling them until a thick syrup is formed; then, having removed the roots, adding as much lard as there is syrup, and stirring well together while the syrup is still boiling. This liniment will draw out the fever and bring the matter speedily to the surface.

Sometimes an abscess forms on the outside, which will need lancing in order to afford the most speedy relief. In this case, cut at the lower extremity of the rising, and let the lancet slant upward into it.

Deafness, unless simply a temporary result of some prevailing disorder of the head or neck, is beyond the art of the veterinary practitioner.

CHAPTER XVI.

POISONING.

I. INTERNAL POISON.——II. POISONING FROM STINGS.——III. POISONED SKIN.

I. Internal Poisoning.

The cases of internal poisoning are more frequent, especially with horses, than is generally supposed. Among the most common are those arising from drastic or powerful doses, blindly given by the ignorant, either in disease, or from some effect sought to be produced upon the general health—to make the coat blooming, cause champing of the bit and frothing at the mouth, or to excite the animal spirits. Of these, strong purgatives, diuretics and arsenic are the most common.

A HORSE SUFFERING FROM DRASTIC POISON.

Other causes are from eating poisonous plants, either in the hay or in the pasture, the ergot of rye and other grain; ergot sometimes attacks the

grasses—thus,smutty grain, castor beans, hellebore or poke root, laurel, stramonium or Jamestown weed, and cured tobacco, among plants, may be mentioned as common. Among minerals, sulphuric, nitric and muriatic acid, and all the concentrated vegetable acids are caustic and irritant poisons. They are never taken unless forced down. The antidote to these is large doses of powdered chalk, whiting or lime water. In the absence of these give weak lye (white lye) until relief is obtained and follow with a full dose of linseed oil.

Alkalies destroy the tissues. If quick lime, caustic potash, strong lye or washing soda has been taken give vinegar and water to neutralize it, and follow with a dose of oil.

Horses that are dosed with whisky to "give them strength" sometimes show alcoholic poisoning. Never give it except as a stimulant as advised for disease.

Forty grains of arsenic will kill a horse. The symptoms are, intense thirst, quick, feeble pulse, great pain in the bowels, with purging sometimes, irregular breathing, faintness, paralysis, convulsions and death. Give full doses of oil, in which is mixed two, three or four spoonfuls of carbonate of iron as the case may seem to demand.

Corrosive sublimate is a fatal poison. A quarter of an ounce will kill a horse. The symptoms are violent pain, intense thirst, effusion, and bloody discharges from the bowels, trembling, salivation, ending in stupor and death. Give the whites of a dozen eggs, stirred in a little warm water. Follow this with linseed tea, or better with mucilage of slippery elm. Litharge and sugar of lead are poisonous. The symptoms are staring coat, arched back, a protruding tongue and foaming at the mouth, staggering, and sometimes dashing wildly to and fro. , Give large doses of purgatives to be followed by from one to two ounces of iodide of potash daily for seven or eight days.

Strychnine is a quick and potent poison. Eight to ten grains will always kill. The symptoms are violent trembling succeeded by stiffness and jerking of the limbs, spasms, rigid limbs, arched back, difficult respiration, succeeded by intervals of quiet; but which are again brought on by a slight noise or even a touch. Soon the animal dies. Keep the animal quiet and in a dark place, and give a quart of sweet oil or linseed oil. Follow with powdered charcoal mixed with thin mucilage. Move the bowels by means of injections as quickly as possible, and if exhaustion ensues give stimulants (whisky) freely.

Tartar emetic in doses of two to four ounces will sometimes kill a horse. The symptoms are, thirst, vomiting and purging, staggering, colic, salivation, convulsions and paralysis.

Give strong tea, followed as soon as you can get it, with a decoction

of white oak bark. For the vomiting and purging, if they continue, give ounce doses of laudanum in a little water.

Poisoning from aloes, castor oil or croton beans, known by excessive bloody purging, and straining, cold ears and legs, hot, dry mouth, and bloating. Give two ounces of laudanum in a quart of linseed tea, and if necessary give a like dose by injection.

In poisoning from ergot or other diseased and injured foods, give full doses of linseed oil, both by the mouth and as injections, with stimulants afterwards; and tonics, say eight grains of quinine three times a day during recovery.

For poisoning by white hellebore or Indian poke, give whisky in pint doses. The same means may be used in poisoning by laurel, followed by injections of salt and water, and also by linseed oil given as a purge. In case of poisoning by opium or laudanum, pour cold water on the head from a considerable height, and keep the animal in constant motion. For poisoning with Jamestown weed (jimson) known by faintness, giddiness, followed by convulsions, paralysis and stupor, give a quart of linseed oil with two ounces of laudanum. Give also an injection and subsequently stimulate with pint doses of whisky.

Tobacco poisoning is shown by purging, offensive dung, colic pains, weak pulse, prostration, convulsions and stupor. Give a purge of oil, and follow with pint doses of whisky in slippery elm or linseed tea.

II. Poisoning from Stings.

It is not infrequent that animals are badly stung, or bitten by venomous serpents or insects.

For the stings of insects, as wasps, hornets and bees, wash the stings repeatedly with onion juice, or ammonia three parts to one part of oil. Washing with salt and water is also an excellent remedy.

In some portions of the West and especially in the South, gnats and certain species of venomous flies come in Summer. The remedy against this is to use petroleum. When these insects are very bad it is usual to smear the unprotected parts of the animal's body with a mixture composed of one part of tar to two parts of lard. We prefer equal parts of petroleum, lard oil, and tar. Bacon drippings may be substituted for the lard oil or lard. For the stings of centipedes, scorpions, tarantulas and other venomous spiders, give the following:

No. 208. 1 Tea-spoonful of ammonia,
1 Pint of whisky,
½ Pint of warm water.

Wash the bitten part with ammonia frequently, and keep it soaked therewith by means of a sponge.

Bites by venomous serpents are to be treated in the same way. The wound should be well cauterized when first discovered with an iron at a white heat. The doses of whisky we have given are full ones. One half this quantity of proof spirits given every hour with a little ammonia until relief is obtained will be proper, but in bad cases give the full dose as a first one, and always with water.

III. Poisoned Skin.

There are many weeds and plants that sometimes cause irritation and poisoning of the skin. The means of cure is to move the bowels and apply some soothing wash to the irritated parts. For injury from poison oak, poison ivy, hemlock, St. John's wort, etc., wash with a decoction of golden seal three times a day, oiling the surface at night. In the morning wash away the oil with soap and warm water, and use the golden seal again. A solution of sugar of lead is also a specific for vegetable poisoning of the skin.

CHAPTER XVII.

VETERINARY SURGERY.

I. CASTRATION.——II. BLEEDING.——III. TRACHEOTOMY.——IV. PERIOSTEOTOMY.——V. NEUROTOMY. ——VI. DIVISION OF THE TENDONS.

GENERAL REMARKS ON SURGERY.—Every person who has the care of farm stock, or who has the care of horses, should understand some of the simpler means used in veterinary surgery. The castration of animals, for instance, is exceedingly easy and safe if a few simple rules are observed. If done in a bungling or improper manner, the chances, except in the case of very young animals, are against recovery. Bleeding is sometimes absolutely necessary to save life. When necessary it should be promptly performed. Tracheotomy also, as cutting into the windpipe is called, must sometimes be performed before a surgeon could possibly reach the animal. Periosteotomy, as operating upon the membrane of the bones of the leg is called, had better be left to the veterinary surgeon entirely; so again, neurotomy, the division of the nerve which supplies the hoof of the fore leg with sensation, had also better be left to the surgeon. In all division of tendons, fractured limbs and various disabilities to which animals are subject, every horseman ought to know what to do. The diseases of animals have been pretty thoroughly treated of in this work. Some of the operations of surgery must therefore receive the attention their importance deserves.

I. Castration.

Calves, lambs and pigs should be castrated when quite young, always before the sixth week of their life. Lambs and pigs should be castrated at from one to two weeks old. Colts are not usually castrated until one year old, since thus they retain more of the natural vigor and style of the entire horse.

In the case of colts and old horses the structures are tough and the cords strong, consequently clamps (grooved sticks) so twined together at one end that when pressed together and tied firmly the cord will be held so tight that circulation is entirely stopped are generally used.

How to do it.—Cast the colt or horse and fasten him securely, having everything ready, a keen, round-pointed knife, clamps and cords. Seize the scrotum making a clean cut through the integuments and well into the testicle, and in a line so the cut shall be parallel to the median line, or line dividing the scrotum. Clean the envelop of the testicle, leaving it as near intact as possible, as the envelop must remain with the animal. Draw the testicle out, put a clamp on the cord and seizing the other end of the clamp with a pair of pincers press it strongly together, and tie securely with a waxed thread. So proceed with the other side. The horse may then be allowed to get up. In thirty-six to forty-eight hours, the sticks are to be removed by cutting the strings.

Another mode, and a most excellent one, especially in the case of colts, is after freeing the testicle of its envelop and exposing the cord, to seize the artery beyond where it is to be secured, with a pair of pincers made for the purpose, cut the cord and twist the artery seven or eight times; let go, and with its retractive force it will retain the twist and prevent all bleeding. Another way is to tie the artery and allow the ends of the strings to hang out of the orifice. The plan by torsion, twisting by the pincers, is the plan to be preferred.

In castrating, do not be afraid to make an extensive cut, and do not leave the cord too long, else it may be strangulated, and fever and inflamation ensue. If this should unhappily occur, enlarge the opening and push up the cord. If there is formation of matter, hasten it by fomentation with warm water. When a free exudation of cream-like matter is established, the animal will go on to recovery as granulation progresses. Wash the parts daily with tincture of aloes and myrrh. If, however, the work has been properly done, the animal will suffer little inconvenience, and nothing more need be done.

The best time for castrating colts and horses is from the middle of May to the first of June, in the North, and in the South about the time the young grass is a full bite.

II. Bleeding.

There are cases where bleeding must be resorted to to save life. These are brain disorders and some forms of inflammatory disease. The jugular vein is the one to be bled from, and when the object is to deplete the system, six, seven, and even eight quarts should be taken. Always catch the blood in a vessel, as it is necessary to know how much we take.

By pressing on the jugular vein along the neck, below the spot selected for the incision, it will soon rise up prominently. In bleeding, always make the incision in the line of the vein, never across it. Make the incision large, but never through both walls of the vein. When sufficient blood has been taken, raise the lips of the vein between the fingers, thrust a pin through and wind some thread dipped in the blood about it to hold it.

In staggers and diseases of the brain, it is usual to bleed in the roof of the mouth.

Whenever a horse is to be bled, it is better to blindfold him, since it prevents his starting, and thus causing a miss with the lancet or fleam in the hands of an inexpert person.

III. Tracheotomy.

The operation of tracheotomy consists in cutting down into the windpipe, in all desperate cases where the animal is likely to suffocate for want of breath. In bad cases of strangles, or other obstruction to breathing, it is sometimes necessary to save the life of the animal, and there is no time to wait for a surgeon.

How to do it.—Have an assistant hold the horse's head high, with the nose extended, so as to best stretch the skin of the neck. Then feeling along the neck for that part least covered with flesh, make a bold incision with a sharp knife—one with a round point, and thin, being preferable. Make the incision about four inches long, and along the central line of the windpipe, and down to it. Then with a sharp-pointed knife pierce one of the upper exposed rings of the windpipe, cut downward along the central line, dividing two or three of them; introduce a tracheotomy tube, which has a movable collar to prevent going in too far, and fasten its strings around the neck to hold it in place. The spout of a tea-kettle has been extemporized as a tube, and with good effect. This tube must be allowed to remain until the animal can breathe through the nostrils, when the wound may be sewn up and treated as any other clean cut.

IV. Periostcotomy.

This is cutting down to the bone, and through the periosteum, the nervous vascular membrane immediately investing the bone, and which in health has little or no sensibility, but which in disease of the bones is exceedingly sensitive. It is sometimes performed in inflammation of the shank bone, when exudation has taken place between the membrane and bone, giving rise to thickening and the formation of bony matter.

How to do it.—Pass an extremely narrow-bladed knife through the skin half an inch below the swelling, and carry the point carefully up over it, dividing the periosteum or membrane. Then cover with a wet bandage, or put in a seton.

A better way is first to make a snip above and below the tumor with a pair of roweling scissors. Then with a blunt seton needle fixed in a hollow handle by means of a screw, and armed with a tape knotted at the end, force it in at the lower snip and carry it up and out at the other, breaking down the cellular tissue of the tumor. A probe-pointed knife is then introduced slicing the tumor. The knife is withdrawn, and the needle, released from the handle, is passed in at one opening and out of the other, the end withdrawn from the needle and thus the seton is fixed. The operation should be performed by a surgeon. The first operation, simply cutting through the periosteum, is altogether the better course.

V. Neurotomy.

This is the division of the nerve of the hoof in navicular disease when other means fail. It will give relief from pain, but it is no cure, and generally the disease goes on advancing until the animal becomes worthless. We should never advise the operation upon an animal with a weak hoof. The operation must of necessity be performed by a competent surgeon who understands the anatomy of the foot and leg.

VI. Division of the Tendons.

There are some disabilities, as bad cases of knuckling over, carrying the tail awry, or only the toe of the hind leg may be able to be put to the ground, from contraction of the perforans tendon. Relief is obtained by division of the tendons, but it should always be done under the advice of and by a competent surgeon and with proper instruments.

CHAPTER XVIII.

MISCELLANEOUS MINOR DISEASES.

I. PIGMENT TUMORS. — II. EPITHELIAL CANCER. — III. DROPSY OF THE LUNGS. — IV. STINGS AND BITES. — V. FALLING OFF OF HAIR. — VI. ACUTE IRRITATION OF THE SKIN. VII. HARDENING OF THE SKIN. — VIII. EXOSTOSIS OF THE LOWER JAW. — IX. SWELLING BY PRESSURE OF THE BRIDLE. — X. SORE NOSE. — XI. ROARING, OR HIGH-BLOWING. — XII. WIND-GALLS. — XIII. RUPTURE OF THE HAMSTRING. — XIV. INTERNAL HEMORRHAGE. — XV. PARTIAL PARALYSIS.

I. Black Pigment Tumors.

Those black pigment tumors known by the learned name of Melanosis, and which are so common in gray and white horses, attacking the bare parts of the skin, as the anus, the vulva, the sheath, the udder, the lips, the eye-lids, etc., are occasionally cancerous, but for the most part quite harmless. If they are deemed objectionable, as disfiguring the animal, remove them with the knife.

II. Epithelial Cancer.

This is a nipple-like cancer, which sometimes appears on the lips of horses. It should be promptly removed with the knife, after which the part should be burned over with lunar caustic.

III. Dropsy of the Lungs

This results from valvular and other diseases of the heart. When the ear is placed to the chest, and the horse struck on the other side with the open palm, the sound heard is nearly the same as that heard in pneumonia; but it may be distinguished from pneumonia by the entire absence of fever which characterizes lung dropsy. It is usually beyond medical reach, as the diseased heart, its original cause, is generally incurable.

No treatment, in addition to that already prescribed for heart disease, can be recommended.

IV. Stings and Bites.

Hornets, wasps and bees often attack horses, and sometimes cause them serious injuries. To relieve a case of this kind, we use one of the following remedies, with which the coat must be thoroughly saturated: Solution of ammonia; weak carbolic acid wash, (1 ounce to a quart of water); 1 pint of lime water, in which 1 drachm of carbolic acid is dissolved; or oil of lobelia.

Cases are recorded of horses having died in consequence of an attack of bees. In ordinary cases, the preceding direction properly carried out will be sufficient; but in more aggravated ones, sponge the whole body with lime water, and then smear with linseed oil. If lime is not accessible, use a weak solution of soda. Spirits of turpentine and laudanum, in equal parts, will give relief.

To prevent the stings of gad-flies, make a strong infusion of the green bark of the elder, and wash the flanks before going out. To prevent the bites of buffalo-gnats, that are so troublesome along the lower Mississippi, cover the parts most likely to be attacked with a mixture of tar and lard —two parts of lard to one of tar.

V. Falling Off of Hair.

. or that unwholesome state of the skin and hair glands known by the learned terms of humid exanthema and dry exanthema, that causes the falling off of the hair, the following is an excellent local remedy when the animal is not under general treatment for some disease primary to the state now under consideration:

No. 209.
1 Ounce pulverized charcoal,
1 Pint olive oil,
5 Ounces pyroligneous acid,
1 Ounce common salt.

Mix, and rub upon the parts daily with a sponge or a soft rag.

VI. Acute Irritation of the Skin.

For that acute irritation of the skin consequent upon clipping, with which some horses suffer so much, wash twice a day carefully with a solution of soda (2 ounces of soda to a bucket-full of water). If the horse is especially feverish and sore, give the following purgative:

No. 210.
8 Ounces castor oil,
2 Ounces tincture of aloes,
2 Drachms essence of peppermint.

In grooming, use a soft brush, and discard the curry-comb until the soreness and tenderness are gone.

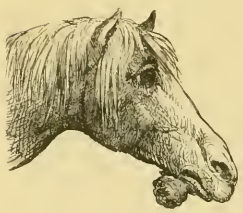
VII. Hardening of the Skin.

For that hardening of the skin which takes place in consequence of the pressure of some portion of the harness, from cutting the integuments and sub-cellular tissue, from the calkings of the shoes, from cauterized fungi, etc., use the acetate of cantharides as an application to the indurations:

No. 211.
1 Ounce acetate acid,
5 Ounces water,
1 Ounce pulverized cantharides.

Mix, and let the mixture stand fourteen days to soften. Then filter through linen or blotting paper, and add one ounce of spirits of wine. Apply it occasionally by means of a bit of sponge. Or, use equal parts of oil of turpentine and olive oil applied in the same way.

VIII. Exostosis of the Lower Jaw.



TUMOR CAUSED BY CURB-CHAIN.

That unnatural enlargement or bony excrescence of the lower jaw, known by the above name, is generally caused by a tight curb-chain used with a curb-bit of such leverage as to enable the rider to inflict injury by violent jerking. The jaw-bone is bruised, and soon enlarges. The injured portion must exfoliate, or scale; and the presence of this unnatural substance under the flesh and tendons gives rise to a foul ulcer, unless steps are taken to give relief while the hurt is comparatively recent.

Nature makes a constant effort to heal, however, and unless the tumor is irritated by passing particles of bone, it partially heals, so that an obstacle is interposed from time to time to the escape of the scales; and in this way an unnatural bony structure is formed and matured before the bony tumor is entirely healed. To prevent this, open with a keen knife, as soon as the bone is found to be injured, and keep the wound open by using the elastic syringe and warm water, until the discharge has assumed an offensive odor—then syringe into it several times daily, this solution:

No. 212.
1 Scruple chloride of zinc,
4 Drachms essence of anise seed,
1 Pint water.

If taken in time, and treated in this way, the healing may take place without deformity.

When once the bony excrescence has established itself, no one but a skillful veterinary surgeon should be entrusted with its removal.

IX. Swellings by Pressure of the Bridle.

These, as the designation indicates, are swellings, sometimes sores, and occasionally, when of old standing, callous lumps, made by the pressure or rubbing of the bridle upon that little prominence on the neck just below and back of the root of the ear. If the swelling is simple and recent, remove by saturating it with the camphorated corrosive sublimate (No. 2) and drying in with a hot flat iron, held close without touching. This must be attended to once a day, and the bridle must be kept off during treatment. If there is a sore without fungous growth (proud flesh) the same treatment will be found effective.

If the tumor is of old standing and fungous, the proud flesh must be burned away with lunar caustic. If it is old and horny, resort must be had to the knife, after which the wound may be healed by a dressing of simple cerate, or of any of the unctuous oils.

X. Sore Nose.

The nose sometimes becomes sore from long-continued purulent discharges, from any irritating substance introduced, but generally from grazing near some irritating weed or vine. Jamestown weed will often poison the noses of horses, yet the leaves, buds and pods are eaten with impunity. So-called "sneeze weed" will also irritate the nose and cause it to become sore. As a rule rubbing the nose with mercurial ointment in which equal parts of sulphur and lard has been intimately mixed will effect a cure. Apply with a mop, if out of reach of the hand, to be rubbed in as well as may be possible.

XI. Roaring and High-blowing

This is when a horse emits any unnatural noise in traveling, whether he simply be thick winded, or emits the peculiar noise when hard urged, or the sharp sound denominated whistling and piping, similar to roaring, but a more confirmed type, occasioned by a strong closing of the rima glottidis. Whistlers are simply chronic or confirmed roarers, and roaring precedes whistling. Both impediments to breathing are produced by atrophy or wasting or degeneration of the muscles whose office it is to dilate the larynx.

Thick wind is from an inflamed and thickened condition of the smaller

and lower branches of the breathing tubes, whistling from a narrowing or constriction of the windpipe. Roaring, again, is of two kinds, acute and chronic. The first is, in comparison with the chronic and confirmed state, light and trivial. Fortunately it is comparatively rare in the United States, but quite common in England, and essentially a disease of high or well-bred horses.

True high-blowing, as understood by English horsemen, is not considered a disease or impediment. There is no sound made during inspiration. The air is expelled during and after hard exertion, with force and a peculiar vibration of the nostrils, causing the sound.

Causes.—Any and all of these impediments are produced by various affections, and some of them, as thick wind and roaring, are considered by some as hereditary. Laryngitis, distemper, bronchitis, pneumonia, tumors, diseases of the nasal membranes, and tight reining. Roaring and whistling are decided unsoundness. So also should thick wind be considered, if the horse is to be used for any other than slow work.

How to know it.—One of the means used is to go into the stall, take the horse by the head, and make a motion as though to strike him across the side with a stick. The animal will probably spring towards the manger, and if a roarer, the peculiar grunt accompanying the habit will be made. Yet it must be admitted that some horses, under the impulse of sudden fear, will grunt. The best test is to put him to speed more severe than usual. If the trial is objected to, be sure there is something wrong, and be sure also that there are no straps about the neck to prevent or ease the habit. In addition to the ordinary sound made by roarers, they often, indeed usually, have a loud, hard, sharp cough, between a cough and a roar. If occasioned by laryngitis, this cough will be indicative of the chronic stage of that disease. So a thick-winded horse will have a short, hard, dry cough, which he will give upon making any sudden movement, or upon being struck sharply upon the abdomen.

What to do.—Remedies are of but little avail, except as palliations. In slight cases, and during the earlier stages, swabbing the larynx with a solution of nitrate of silver has given relief. It is prepared by dissolving at the rate of ten grains of nitrate of silver to each ounce of distilled water, and is applied by means of a small, soft sponge fixed on the end of a piece of whalebone, the sponge having a cord attached and longer than the handle, so as to be recovered if it comes off. Pads have been attached to the nose-band of the bridle, so as to lie on and compress the false membrane of the nose. These have given relief if the horse is not required to make extra exertion. Firing or blistering about the region of the larynx has also been successfully used as a means of relief.

When roaring is caused by paralysis of the muscles of the larynx, hypodermic injections of strychnine every two or three days in half grain doses has given relief.

Relief is also sometimes given by rubbing on daily, or once in two days, the following:

No. 213. 1 Drachm iodine,
2 Drachms iodide of potash,
2 Ounces lard.

Mix at a heat little more than to melt the lard, by placing in a vessel of hot water.

In all of the diseases mentioned, good, easily-digested food should be given, and only sufficient water to satisfy the actual demands of the system, and the animal should not be put to work within an hour of eating his food.

Thick Wind.

This may be alleviated, and sometimes cured, by giving the following ball once or twice a day for several days in succession, as the animal may seem to need it:

No. 214. 1 Drachm powdered camphor,
1 Drachm powdered niter,
1 Drachm powdered opium.

Or if preferred, to be given once a day, until five or six doses are taken, the following.

No. 215 1 Drachm powdered niter,
1 Drachm extract belladonna.
3 grains arsenic.

XII. Wind-galls.

Causes.—Windgalls may arise either from strains, over exertion, or dropsy of the parts. As a rule they are elastic, round swellings on each side of the tendons, rarely becoming solid from coagulation of the lymph, unless as is occasionally the case, the strain is so severe as to cause inflammation of the bone, ulceration and bony deposit. They do no injury whatever, and do not cause unsoundness.

What to do.—If the puffs, windgalls, are just appearing they may be scattered sometimes by a strong decoction of white oak bark and alum. They may be reduced by blistering from subsequent contraction of the skin; so the liquid lymph may be drawn out with a hypodermic syringe, after which a wet bandage should be applied over the part.

If there is heat and tenderness in connection with the windgalls it must be treated with fomentations and a high-heeled shoe as recommended for such disabilities. As a rule simple windgalls being so common, often appearing on colts, and doing no injury, had better not be meddled with unless there is inflammation attending them.

XIII. Rupture of the Hamstring.

Not only the hamstring but other sinews are subject to rupture or even division. In this case the parts should be brought together and held so by starch bandages or splints or both, when fibrous tissue will form and the ends will unite in three, four, or five weeks. If inflammation occurs it must be treated as heretofore advised.

XIV. Broken Wind.

HOW TO HEAR THE SOUND MADE IN THE HORSE'S WINDPIPE.

A horse with broken wind is in pretty much the same condition as a man with the asthma. It is said often to occur suddenly, as after unusual exertion, or after severe work upon a full stomach. The facts are, these may have aggravated and suddenly made apparent symptoms not noticed before. There is no cure, but much may be done to alleviate the distress and enable the animal to do ordinary slow work.

How to know it.—There is often, for a long time previous to a severe attack, more or less cough—a short dry hack, and occasioned by irritability of the larynx. The appetite is often ravenous and morbid, the thirst excessive. As the disease progresses there is flatulence, a pendulous belly, a ragged coat, and a general dejected and unthrifty appearance.

In breathing there will be a three-fold effort. The inhalation will be quick, the expiration slow. Then the abdomen will rise as in an effort to drive forward the diaphragm, and thus empty the half expired lungs. The two last efforts seem laborious, and the double effort is often only partially completed when the animal is again forced to gasp for breath.

In the earlier stages the peculiar sound made is in the windpipe. The cut given will show the manner of listening to sounds for throat difficulties. Every horseman should accustom himself to recognize not only the sound indicative of healthy breathing but also those given out in various diseases of the throat. No horse with heaves or broken wind should be driven immediately after eating. The food should be sound, and water should be given only in small quantities.

XV. Internal Hemorrhage.

Internal bleeding or hemorrhage is rare unless made by puncture of some of the deep-seated blood vessels. The orifice leading to the surface being obscure and high, will of course occasion internal bleeding. When they can be got at the remedy is of course tying. Punctured wounds do not bleed much, the clot usually closing the orifice, assisted by the contraction of the vessel. In transverse or oblique clean cuts of an animal causing wounds to the important arteries death must follow unless they can be cut down upon and tied.

Rupture of the blood vessels of the lungs sometimes occurs from over exertion, and is also common from the nose. Or hemorrhage of the lungs may arise from any pulmonary complaint involving the blood vessels. In this case it must be determined. If the blood comes from both nostrils and is frothy, it is from the lungs. If the horse has no specific disease of the lungs, and is in full flesh, bleeding from the neck vein, a full stream, may check the blood. Digitalis in fifteen grain doses may be given. It may give present relief, but probably there is no permanent cure.

INTERNAL HEMORRHAGE.

If the bleeding is from the blood vessels of the nose, a strong solution of alum may be syringed up the nostril. If this fails, pour half a pint of boiling water on a drachm of matico leaves, and when cool strain and inject it up the nostril.

Chronic hepatitis, congestion and inflammation of the liver, often results in hemorrhage internally. The symptoms confirming this state of things are, the mouth cold, nasal membranes pallid, the eyes ghastly, sometimes yellow. The horse will look for the seat of pain on the right side, and usually lies on the left side when down. The head is depressed. As the disease progresses there is increased weakness with staggering. The pupils of the eyes are dilated; the sight is bad, and if the head is attempted to be raised high the animal instantly shows signs of falling.

What to do.—Put the animal in a roomy stall, or loose box. Keep the bowels regulated by grass and bran mashes only, with nutritious food and as much gentle exercise daily as the animal can take. Prepare the following:

No. 216. 2 Ounces iodide of potassium,
1 Quart liquor potassa.

Mix, and give two table-spoonfuls twice a day in a pint of water.

V. Partial Paralysis.

This is a disease principally confined to fast driven horses, or those used to extreme exertion. It is also occasioned by ergot in the hay or grain and then is known as ergotism. An injury to the brain may cause paralysis of the opposite side of the body. So paralysis of the face, body or limbs may arise from pressure on the brain. Paralysis of one side of the body, called hemiphlegia, may result from disordered brain or spinal cord. So paralysis of the face, ear, eyelid, lip, tongue, larynx and tail may arise from local causes. A current of cold air continually striking a part, bad fitting bridles, collars, or other parts of the harness. Paralysis of the hind limbs is the most common form and may result from injury to the loin or back, from indigestion, from tumors, parasites, inflammation or softening of the spinal cord, from eating freshly ripened seeds of some of the grasses (the loliums) as darnell, flax rye grass, and perennial rye grass.

What to do.—The cause must first be found. See articles on inflammation, poisons, indigestion, etc.

HORSE SUFFERING FROM PARTIAL PARALYSIS OF THE HIND LEGS.

If the paralysis proceeds from an incurable disease it is to be treated by cold water shocks and subsequent friction by rubbing. Among the best means is a current of electricity daily.

The following ball has resulted in relieving the difficulty when it was partial paralysis of the hind limbs:

No. 217. ½ Grain strychnine,
½ Grain iodine.

Work this up into a ball with powdered quassia and molasses and give daily, gradually increasing the strychnine according to its effects, so that at the end of three weeks one grain will be given daily, and, if good effects are produced, a grain and a half may be given daily at the end of five or six weeks.

Paralysis is, however, past cure. Something may be done for present relief, but each recurring attack is more and more severe. The most strengthening food should be given and the best of care, always being careful that the animal be not subject to cold drafts, or extraordinary labors. During the recurrence of the attacks, absolute rest and quiet must be given. In the giving of nerve stimulants, as strychnine, when increasing the doses gradually, if twitching or slight cramps of the muscles are observed, cease giving for a few days and then begin again with the smallest dose.

CHAPTER XIX.

MEDICINES.

What to Keep, How to Obtain, How to Prepare, and How to Give Them.

I. ALTERATIVES.——II. ANÆSTHETICS.—— III. ANTISEPTICS.——IV. ASTRINGENTS.——V. CATHARTICS.—— VI. CARMINATIVES. —— VII. COUNTER IRRITANTS. —— VIII. CAUSTICS.—— IX. DIAPHORETICS.——X. DIURETICS.——XI. DEMULCENTS.—— XII. DISINFECTANTS AND DEODORIZERS.—— XIII. EMETICS AND EXPECTORANTS. —— XIV. NARCOTICS, ANODYNES, AND SEDATIVES. ——XV. RELAXANTS.—— XVI. STIMULANTS. —— XVII. TONICS.——XVIII. VERMIFUGES.——XIX. IMPORTANCE OF SYMPTOMS.——XX. DISSECTION. —— XXI. SURGICAL AND OTHER INSTRUMENTS.——XXII. MEDICINES TO BE KEPT.——XXIII. DOSES.

It is not necessary that every farmer should keep a large quantity of medicines on hand. A few simples will suffice, except in the case of those who, having a large stock of animals, require medicines to meet cases apt to arise. The great point we have insisted on, and here reiterate, is good care and attention, in health, and good nursing in sickness, as being most important in the care of farm animals. The day has past for bleeding and purging for every ill that even horse flesh is heir to. Good nursing, attention to the general health, and to symptoms, with the prescriptions we have given, will enable any one to carry an animal through an ordinary sickness.

Every person who has carefully studied this work will see the necessity of keeping some medicines on hand, since there is no reason why, with the aid of what we have presented, he may not be able to treat nine in ten of the diseases to which farm animals are subject, and without the aid of a professed veterinary surgeon. The very full glossary which will be found as a part of this work, should be consulted for medical terms used when the definition does not immediately follow the use of the term. In naming the medicines and their effects in this chapter we shall give definitions that may be found in the glossary, since in the division of the subject of medicines it seems proper that we should follow the rule adopted of defining the meaning of terms in the body of the work. The operations of medicine may be defined as follows:

I. Alteratives.

Medicines acting generally and continually on the system, especially on the blood and glandular system. Among the alteratives are, antimony,

niter, sulphur, ginger, calomel, arsenic, iodine, iodide of potassium, sulphite, or bi-sulphite of soda.

Antimony.—Black sulphuret of antimony. Dose 1 to 2 drachms. Given in connection with sulphur, 1 to 2 ounces, and niter 4 to 6 drachms.

Ginger.—Given as an alterative only in connection with other medicines.

Calomel.—Give in broken doses, say 1 scruple. Another form of mercury, sulphuret, give 3 drachms once a day in connection with 4 drachms cream of tartar in a pint of water. This has been recommended in obstinate cases of surfeit, and other affections of the skin.

Arsenic.—Dose 5 to 10 grains daily. It should only be used under the direction of a veterinarian. Its action is principally on the nerves. Fowler's solution of arsenic contains 4 grains to the ounce. It is the best form in which to administer the mineral.

Iodine.—As an alterative give 10 to 20 grains.

Iodide of potassium.—Dose 1-2 to 1 drachm. Valuable in chronic rheumatism, chronic cough, scrofulous enlargements, and to cause absorption in pleurisy, and inflammation of the lungs.

Bi-sulphite of soda.—*This must not be confounded with sulphate.* Dose 1-2 to 1 ounce relieves tymphany.

II. Anæsthetics.

These remedies benumb the senses, relieve pain, and are used largely in destroying sensation in performing principal surgical operations. All that will be necessary to notice are·

Chloroform and Ether. The best and safest preparation is the following:

No. 218. 1 Ounce alcohol,
2 Ounces chloroform,
3 Ounces ether.

Cast the animal to be operated upon: pour a table-spoonful on a sponge and hold to the nostrils so that the animal can take some air with it, since if not mixed with air, it is fatal to life. Keep the fingers on the pulse, and if it ceases, or intermits decidedly, discontinue, and hold harts-horn to the nose, and commence again more lightly. So soon as unconsciousness is produced, suspend the use of the anæsthetic, and renew again from time to time, until the operation for which it is given is completed.

Sometimes the animal will continue low for some time after the administration, with failing pulse and irregular breathing. If so, pour pails of cold water on the body, and if necessary, gently inflate the lungs with a pair of bellows, at the same time pressing upon and releasing the ribs, as in natural respiration. Also press pieces of ice into the rectum, or

vagina, according to the sex, as an additional means of restoration, if necessary. As the natural functions again act, clothe the body and rub dry. From two to four minutes should be sufficient to produce complete insensibility in either the horse or ox.

III. Antiseptics.

These are used to arrest mortification and putrefaction. The principal agents are charcoal, creosote, pyroligneous acid, sulphate of zinc, and yeast. They should be applied directly to the parts affected.

IV. Astringents.

These are agents used to stop or lessen discharges, either of the bowels, nose, blood vessels, kidneys or glands, and are applied both internally and externally. Among those usually employed, are, acetate of lead, alum, catechu, ergot, kino, opium, per sulphate of iron, tannin, the mineral acids, and gallic and tanic acids.

They should not be used when there is considerable inflammation; nor for diarrhœa, in the beginning of a difficulty, since this flux is often an effort of nature to relieve the body by natural means.

Acetate of lead.—Dose, 1 to 2 scruples. As a wash, use a saturated solution.

Alum.—Dose, 2 to 3 drachms; useful in sore throat and dysentery. In powder, used for stopping the flow of blood.

Catechu.—Dose, 2 to 5 drachms. Useful in diarrhœa.

Ergot.—Dose, 1-2 to 1 ounce. Checks bleeding from the lungs, nose, stomach and bowels. As an astringent, for this purpose, it is better to give it by hypodermic injections, using ergotine in solution in five grain doses.

Kino.—Dose, 1-2 ounce to an ounce. Given in diarrhœa.

Opium—Laudanum.—Dose, powdered opium, 2 drachms. Laudanum, 2 to 4 ounces. It is a well known agent in relieving the spasms of colic, dysentery, lockjaw and other convulsive ailments. In diseases of the lungs and breathing tubes, if the respiration is short and quick, it should not be given. So, if there is much fever it should not be given until these symptoms abate.

Per sulphate of iron.—Dose, 1 to 2 drachms. Useful for arresting bleeding or hemorrhage.

Tannin.—Tannic acid is the best form. Dose, 10 to 20 grains. A powerful astringent in diarrhœa or mucus discharges.

V. Cathartics.

These are medicines acting strongly and directly on the bowels as a purge, in from 3 to 12 hours. Strong purgatives should not be given except it be necessary to thoroughly evacuate the bowels, and deplete the

animal system. The principal agents employed are aloes, croton oil, linseed oil, podophyllin and salts.

Aloes, Barbadoes.—This should always be used in preference to Cape aloes, which is more griping. Dose 4 to 8 drachms.

Croton oil.—A powerful and sharp purgative, valuable in obstinate constipations. Applied externally it is apt to irritate and produce blemish. Dose internally 20 drops.

Linseed oil.—A safe, and pretty sure, mild purge. Dose 1 pint to 1 quart.

Podophyllin.—This is the active principle of the May apple. It is both purgative and sedative. Dose 1 to 2 drachms. Its effect on animals is not so marked as on man. In the commencement of fevers it is excellent.

Salts.—Sulphate of soda or Glauber salts is generally used when purgative effects are required. The dose is 1 to 1 1-2 pounds. Epsom salts, sulphate of magnesia, dose 1 to 2 pounds, or 8 to 12 ounces, and repeated every three or four hours until an operation is had.

VI. Carminatives.

These are used in colic, griping, etc., and are often given with griping medicines. The principal agents are black pepper, caraway seeds, cloves, ginger, peppermint, sage, etc.

Black pepper.—Dose 2 drachms. When a quick and powerful remedy is required give 2 drachms red (cayenne) pepper.

Caraway.—Dose 1-2 to 1 ounce of the seeds, as a powder, or as an infusion.

Cloves.—Dose 1-2 to 1 ounce of powdered cloves steeped in hot water and given warm, or 30 to 60 drops of the oil of cloves given in thin mucilage of gum arabic.

Peppermint (oil).—Dose 15 to 30 drops in mucilage. Sage or any of the heating herbs may be given as a tolerably strong infusion or tea.

VII. Counter Irritants.

These are divided into classes: Rubefacients, which simply excite the skin to redness; vesicants, which blister, and suppurants which produce sores on the surface. They are serviceable by setting up inflammation on the surface near the seat of disease, in congestion and inflammation of internal organs; also of the bones, joints and tissues. Rubefacients are good in influenza, and other attacks of a general nature, where there is low fever; as, for instance, rubbing a paste of mustard on the legs and washing it off in ten or fifteen minutes. Vesicants should not be used when fever or inflammation is high, and suppurants are chiefly of value in old chronic complaints.

Rubefacients.—Alcohol, ammonia, mustard, turpentine.

Vesicants.—Cantharides, scalding water, and a hot iron at 212 degrees, Fahrenheit.

Suppurants.—Croton oil, ointment of tartar emetic.

VIII. Caustics.

Agents which burn and destroy the flesh. Used to kill the virus in poisoned wounds, eat out proud flesh, destroy sloughs, and stimulate old ulcers; to produce healthy action in fistulas, and remove warts and other excrescences. Among the best agents are butter of antimony, caustic potash, chloride of zinc, lunar caustic (nitrate of silver), nitrate of mercury, nitric acid, and the hot iron at a white heat. Chloride of zinc and nitrite of silver come in pencil shaped sticks. Nitric acid must be used with care. It is powerful and intensely eating, causing extreme pain, but which soon ceases. It may be used by dipping a suitable slip of wood in the acid and applying. The hot iron is the most powerful caustic, as it is the most efficient. It however requires nerve and judgment to use it properly and efficiently.

IX. Diaphoretics.

These are medicines to cause sweating or to increase the insensible perspiration, and thus relieve pressure on other organs. Acetate of ammonia in solution, Dovers powder, ipecac and cantharides are mainly employed; the animal being covered quite warm. Warm water is also useful, but steaming the most prompt of all.

Acetate of ammonia.—Solution. Dose, 2 to 3 ounces.

Dover's powders.—Dose, 3 drachms.

Ipecac.—Given in 2 to 3 drachm doses in warm water, until the effect is produced. Not especially useful for horses.

Cantharides.—Dose, 1 to 5 grains.

X. Diuretics.

These are medicines used to act on the kidneys. Saltpeter, sweet spirits of niter, cream of tartar, turpentine and digitalis are principally used.

Saltpeter.—Dose, 6 to 8 drachms.

Sweet spirits of niter.—Dose, 1 to 2 ounces.

Cream of tartar.—Dose, 1 ounce.

Turpentine (Oil).—Dose, 1 to 2 ounces.

Digitalis.—Dose, 15 to 20 grains.

Both diuretics and diaphoretics are similar in their action. If sweating is intended, it must be assisted with warmth and friction. If operation

on the internal organs is required, warmth and friction should not be used.

XI. Demulcents.

These are gummy or glutinous substances, used to soothe and cover inflamed surfaces, or those in an irritable condition; as inflammation of the throat, stomach and bowels; in diseases of the kidneys, or for irritable conditions generally. Those most in use are: Linseed tea, gum arabic water, slippery elm bark tea, starch water and olive oil. Marsh mallows makes one of the most valuable agents known, being especially soothing to the bowels.

XII. Disinfectants and Deodorizers.

The most valuable of these are, sulphate of iron, chloride of zinc, carbolic acid, chloride of lime, used for disinfecting and deodorizing drains, etc. The cheapest is a solution of sulphate of iron, a good handful dissolved to each bucket of water used. As an atmospheric fumigant and disinfectant, the following is cheap, and one of the best known:

No. 219. ½ Pound flowers of sulphur,
2 Pounds pine tar

Mix with a gentle heat, saturate tow with it and burn without flame.

Carbolic acid in weak solutions, or crude carbolic acid in its liquid, impure form, as it comes from the gas works, is valuable for brushing over any wood, iron, brick or stone work. Also valuable for wetting cloths, and hanging up to destroy disease germs, keep away flies, etc.

The following formulas will be found valuable disinfectants:

No. 220. 1 Part sulphate of zinc,
1 Part powdered oak bark,
2 Parts sulphate of iron.

Mix into balls of proper size and place in drains, sink-holes and cesspools.

Collins' disinfecting powder is made by adding 1 part of burnt alum to two parts of chloride of lime. Pour on water to thoroughly wet the mass, and set in shallow pans about the stable.

The following is a powerful disinfectant:

No. 221. 2 Pounds common salt,
1 Pint oil of vitriol.

Pour the oil of vitriol gradually and slowly over the salt, and the active disinfectant, muriatic gas, will be evolved.

The following, known as chloralum, is not poisonous, and has no smell. To make it take,

No. 222. 1 ½ Pounds chloride of aluminum,
1 Gallon water.
Dissolve.

A most effectual, powerful and cheap disinfectant, but poisonous, if taken, is made as follows.

No. 223. 8 Ounces chloride of zinc,
16 Ounces sulphate of iron,
1 Gallon water.
Dissolve.

A pint mixed in a gallon of water will be quite strong enough for use.

XIII. Emetics and Expectorants.

What would act as an emetic on man, would be simply a nauseant with the horse. The horse does not vomit, nauseants act to loosen a cough, and to loosen the mucus in the air passages, and thus facilitate its expulsion. Nauseants also act as a substitute for the old practice of bleeding. Tartar emetic, blood root and sulphate of zinc are among those usually employed.

Tartar emetic.—Dose, 1 to 1 1-2 drachms, in connection with lobelia and saltpeter.

Blood root.—Dose, from 2 to 4 drachms of the powdered root.

Sulphate of zinc.—Dose, 1 to 2 drachms.

Tartar emetic.—This is often employed in connection with saltpeter and lobelia. Dose, tartar emetic 1 drachm; saltpeter 1 ounce; lobelia 1 drachm.

XIV. Narcotics, Anodynes and Sedatives.

These run one into the other, and are used to soothe pain, allay the irritability of the system, and quiet excessive nervous action. Narcotics quickly quiet the system, induce sleep, and if taken largely, produce *death.* When given simply to allay pain, they are called anodynes. The action of a sedative is to lower nervous force, reduce the pulse and abate febrile symptoms, especially in the beginning of acute inflammation.

Narcotics.—Opium, or its preparations, laudanum and morphia, belladonna, tobacco and Indian hemp.

Opium is generally given as a tincture, in the form of laudanum. Dose, 1 to 2 ounces.

Morphia.—Dose, 3 to 5 grains.

Belladonna.—Dose, 2 ounces.

Indian hemp.—The dose of this drug 1-2 to 1 drachm.

Sedatives.—Aconite, tincture. Dose, 20 to 30 drops.

Veratrum viride.—The dose of this is 1 scruple.

XV. Relaxants.

These deprive the muscles of their power. Of this class lobelia should be given in doses of 1 to 2 drachms.

XVI. Stimulants.

These are, alcohol, and are given in the form of brandy, whisky, rum, gin and ale. The latter when an animal is exhausted by hard driving. The dose of brandy, whisky or gin is 3 to 6 ounces, and of alcohol 1 to 3 ounces diluted with water. Other stimulants are: ether, dose, 1 to 2 ounces; carbonate of ammonia, dose, 2 to 4 drachms; turpentine, dose, 1 to 2 ounces; and ginger, dose, 1 ounce. The ginger to be given as a tea.

Stimulants are used when it is necessary to quickly raise the animal from exhaustion. In nervous exhaustion its effects are marked, but it must not be given in inflammation or fever.

XVII. Tonics.

Tonics sharpen the appetite, increase the nervous vigor, and thus improve the condition of the patient. Many horsemen are fond of giving condition powders, the main value of which lies in the alteratives and tonics contained. In this they suppose that they are beneficial to already healthy animals. Nothing could be farther from the truth. They are not beneficial unless the animal is out of condition and the system needs rallying. To get the best effect from tonics, they should be given in light doses, and continued for a considerable time. Then intermit for a few days, and if necessary, commence again, or substitute another tonic. The mineral tonics, sulphate of iron, sulphate of copper and arsenic are more active than the vegetable tonics, Peruvian bark, gentian, quassia, etc., though often the two forms combined act with greater efficacy than either alone.

XVIII. Vermifuges.

These are medicines supposed to be useful in expelling worms.

For round worms, common salt, to be licked at will, is one of the best agents to expel them. Oil of turpentine 1 ounce. Tartar emetic 2 drachms and sulphate of iron 2 drachms: give five or six days in succession, and follow by a purge. Four to 6 drachms of aloes is one of the best direct vermifuges.

Tape worm.—Oil of turpentine 1 ounce doses; or root of male shield fern, 1 ounce of the extract. Give all vermifuges fasting, and at the end of four hours give a purge of aloes. For weak animals give areka nut 1 ounce.

In using a vermifuge it is always better to clear the bowels before giving it, and in case the worms are in the intestines give injections as well

as a purgative by the mouth. It should be remembered that vermifuges that destroy by mechanical irritation, as iron filings, pounded glass, etc., should never be given.

From the foregoing the action of the different classes of medicines will be learned. Some of the more common we have given as examples. In the vast list of drugs used in medicines, and which are drawn alike from the animal, vegetable and mineral kingdoms, and some of them, the most valuable, being deadly poisons, must not be given in too large doses, the practitioner cannot be too careful in their use. The doses we have given in this chapter are from medium to large. If there is any doubt in using those, especially the strong poisonous extracts or crystals use the smaller.

There are really but few medicines out of the large list that are of real and well known value in common practice. The druggist in preparing medicines, uses delicate scales and weighs accurately. It is always better that they compound the prescriptions if possible; yet, as it is not always convenient to seek the druggist, especially when a stock of medicines in ordinary use is kept, it is better to have a pair of scales and a liquid measuring glass. We therefore append a table of weights and measures as used by veterinarians:

WEIGHTS AND MEASURES.

Apothecaries' Weight.

20 grains make 1 scruple,
3 scruples make 1 drachm,
8 drachms make 1 ounce,
16 ounces make 1 pound.

Wine Measure.

60 minims, or drops make 1 drachm,
8 drachms make 1 ounce,
16 ounces make 1 pint,
2 pints make 1 quart,
4 quarts make 1 gallon.

Sufficient accuracy in fluid measure for anything not violent in its action, will be the following:

60 drops, or 1 tea-spoonful, make 1 drachm,
4 tea-spoonfuls, or 1 table-spoonful, make ½ ounce,
2 table-spoonfuls make 1 ounce.
1 wine-glassful makes 2 ounces,
1 tea-cupful makes 4 ounces,
1 tumblerful makes ½ pint,
1 tin-cupful makes 1 pint.

A handful of flaxseed, or other seed, usually innocent in their nature, will weigh about 2 ounces; a handful of leaves of dried herbs will weigh about 1 ounce.

IX. Importance of Symptoms.

The importance of understanding symptoms in disease, not only of the horse, but of all farm stock, is generally underrated by farmers and stock men, and yet it is the key to all remedial means. Unfortunately, dumb animals cannot tell how they feel, and thus the practitioner must judge by outward signs, which, by the way, are pretty ample to the careful observer. These are difficult to describe in print, yet they have been so described as fully as possible in the list and treatment of diseases.

Every horse owner, and especially every stock-raiser, should educate himself to understand symptoms in such diseases as he must necessarily have to deal with. This will not be found difficult, if the reader will use the means we have presented in this work. The pulse is one of the most important agents in this direction; through this, we may get a pretty accurate indication of the state of the system in relation to fever, plethora of blood, or the reverse. It cannot well be described, and yet it is soon learned by use and observation. In the horse, the mouth is hot and dry in fever, and moist and cool in health. In health the nose of the ox is especially cool and moist, and in fever hot and dry. The full or small pulse, depends upon an excessive quantity of blood in the vessels indicating a full or a weak nutrition. A thready or wirey pulse is indicative of a small quantity of blood in the vessels, combined with an increased or diminished contractibility of the heart. A sluggish or oppressed pulse will indicate unusual fulness of the vessels, the vital powers of contractibility and sensibility not being increased, or, it may even be one or both of them being diminished. Among the internal causes operating on the pulse are irritability and nervousness. Outside causes are temperature, other atmospheric causes, and manner of feeding. The stock man who will habitnate himself to feeling the pulse of his animals, will soon come to understand how slight causes will sometimes affect this agent, and thus will soon learn to detect disease, often by this indication alone. This and attention to the outward symptoms we have given in diseases enumerated, will soon enable him to dispense with the services of the practiced veterinarian, except in critical cases.

XX. Dissection.

If a farmer would, when an animal is sick, in addition to attending to studying the symptoms as they appear, take the trouble, in case it dies, to open it, with a view of studying the altered structure, knowing as he may, how they look in health, this would assist him greatly in understanding disease generally; for by this means he may find just when and how the parts affected are changed. He will thus, also, come to understand the importance of good care and nursing in the prevention and elimination of disease, more fully than by any other one means.

XXI. Surgical and Other Instruments.

With all our care it is necessary to meet disease and accidents when they come, and to this end we must be provided at least with a few simples, and the means of arriving at quantities.

To this end we have advised the purchase of a pair of scales to weigh grains, drachms, ounces and pounds; certain surgical instruments, also, and a small store of the medicines such as are in common use.

In the horse stable a balling iron should be kept. This is an iron ring through which the closed hand may be passed; on the top and bottom are two bars, which placed between the front of the jaws enable the mouth to be kept open while the hand passes the ball of physic to the root of the tongue. Sponges of several sizes should also be kept. A roomy nose-bag and an atomizer will be useful. The little India rubber bottle with which the wife sprays her plants, will answer very well in place of a better, for spraying the external surfaces.

Means for giving injections should be procured. This may be the regular horse or cattle syringe, though the pail and India rubber pipe, described in another part of the volume, will be found simple and effectual.

A drenching horn or bottle is another implement that should not be neglected. A probang should always be kept. A trocar will be found useful in case where the stomach is to be punctured to permit the escape of gas. A knife will, however, answer in its place very well, if the blade be sufficiently long and pointed. An outfit larger or smaller according to the necessities of the stock owner, may be bought in any store where surgical instruments are kept, and in fact in any of the larger drug stores of cities.

A convenient one which we have used contains: 1. A blunt-pointed bistoury, an instrument for making incisions. When only one is to be used we recommend the slightly curved form, with the sharp edge on the inside.

2. Thumb lancet. We are opposed to the old time fleam. It seems to have been invented for ignorant persons; certainly none such should ever operate, even on an animal. A little judgment will soon enable the operator to use the lancet properly and with effect, gauging the depth properly to which the puncture is to be made. It is better than the spring lancet.

3. A spring forceps, most valuable in dressing wounds, catching arteries for tying, for removing foreign substances in wounds, and for a variety of other purposes.

4. An aneurismal needle—a long blunt needle. It can be used as a probe and for introducing small setons.

5. A silver probe, for exploring wounds. It is blunt at one end and sharp at the other, and is indispensable.

6. A frog knife, a narrow straight blade, sharply curved into a strong edged hook at the end, and used for paring and cleaning the frogs of the hoofs, etc.

7. A pair of curved scissors, for trimming the edges of wounds, excising ragged flesh, clipping the hair, and for other purposes.

8. A straight, broad scalpel (knife), used in dissecting, opening abscesses, castrating, and various other surgical operations. Any straight, broad-bladed, keen-edged knife will do. In castrating, however, we have always preferred a round-pointed blade, similar to that used by nurserymen in budding.

9. A seton needle for threading and introducing tapes or other setons.

10. A few surgical needles, white thread and silk, or better, thin catgut. These may all be carried in a neat morocco case made for the purpose, and can be afforded, wholesale, at ten dollars. (In fact we will send them at that price, delivered with this book.)

XXII. Medicines to be Kept, and Doses.

The following drugs will be found handy. Keep everything in white bottles, well corked. Corrosive substances must have ground glass stoppers. The druggist, if so instructed, will arrange things. Quantities of these to be kept should be about ten doses each. 1 dose is:

1. *Acetic acid*—Antidote to acids, cooling astringent. Horse, 1 drachm; ox, 2 drachms; sheep, 1 scruple.

2. *Tincture of aconite*.—Sedative, diaphoretic. Horse, 20 to 30 drops; ox, 30 to 40 drops; sheep, 3 to 5 drops.

3. *Alcohol*.—Stimulant, diuretic, narcotic. Horse, 1 to 3 ounces; ox, 3 to 6 ounces; sheep, 1-2 ounce. Locally, cooling astringent.

4. *Barbadoes aloes* —Purgative. Horse, 4 drachms.

5. *Alum*.—Astringent. Horse, 2 to 3 drachms; ox, 3 to 4 drachms; sheep, 1-2 to 1 drachm.

6. *Ammonia, liquid*.—Diffusible stimulant, anti-spasmodic, anti-acid, diuretic. Horse, 1-2 ounce; ox, 1-2 to 1 ounce; sheep, 1-2 to 1 drachm.

7. *Carbonate of ammonia*.—Diffusible stimulant, anti-spasmodic, anti-acid, diuretic. Horse, 2 to 4 drachms; ox, 4 to 6 drachms; sheep, 1-2 to 1 drachm.

8. *Anise seed, caraway, cardamon, fennel seed*.—Stomachic, carminative. Horse, 1 ounce; ox, 1 to 2 ounces; sheep, 2 to 4 drachms.

9. *Arnica tincture*.—Stimulant, diuretic. Horse, 1 drachm; ox, 1 drachm; sheep, 1 scruple.

10. *Asafœtida*.—Diffusible stimulant, carminative, vermifuge. Horse, 2 drachms; ox, 4 drachms; sheep, 1-2 to 1 drachm.

11. *Balsam of Peru.*—Stimulant, antispasmodic, expectorant. Horse, 1 ounce; ox, 1 to 1 1-2 ounces; sheep, 2 drachms.

12. *Borax.*—Nerve sedative, uterine stimulant. Horse, 2 to 6 drachms; ox, 1-2 to 1 ounce; sheep, 1-2 to 1 drachm.

13. *Blackberry root.*—Astringent. Horse, 2 to 4 drachms; ox, 1-2 ounce; sheep, 2 scruples.

14. *Camphor.*—Antispasmodic. Horse, 1 to 2 drachms; ox, 2 to 4 drachms; sheep, 1 scruple.

15. *Carbolic acid.*—Sedative, anodyne, astringent, antiseptic, disinfectant. Horse, 1-2 to 1 drachm; ox, 1 drachm; sheep, 10 drops.

16. *Cherry bark, wild.*—Expectorant. Horse, 1-2 ounce; sheep, 2 to 3 scruples.

17. *Copaiva.*—Stimulant, diuretic, expectorant. Horse, 2 to 4 drachms; ox, 3 to 4 drachms; sheep, 1-2 to 1 drachm.

18. *Cream of tartar.*—Diuretic. Horse, 1 ounce; sheep, 4 to 6 drachms. Laxative: horse, 5 ounces; ox, 5 to 8 ounces, sheep, 1 to 2 ounces.

19. *Ergot.*—Checks bleeding, parturient. Horse, 1-2 to 1 ounce; ox, 1 ounce; sheep, 1 to 2 drachms.

20. *Iron, peroxide.*—Tonic. Horse, 2 to 4 drachms; ox, 4 drachms; sheep, 1 drachm. An antidote to arsenic.

21. *Lime, chloride.*—Checks tympany, disinfectant. Horse 2 to 4 drachms; sheep, 1 to 2 drachms.

22. *Linseed oil.*—Laxative. Horse, 1 to 2 pints; ox, 1 to 2 quarts; sheep, 1-2 pint.

23. *Lobelia.*—Sedative, antispasmodic, expectorant. Horse, 1 to 2 drachms; ox, 1 to 3 drachms; sheep, 15 grains; swine, 5 to 15 grains.

24. *Mallow.*—Demulcent. Give freely of cold infusion.

25. *Mentha piperita (peppermint).*—30 to 60 drops.

26. *Oak bark.*—Astringent. Horse, 1 ounce; ox, 2 to 4 ounces; sheep, 4 drachms.

27. *Olive oil.*—Laxative. Horse, 1 to 2 pints; ox, 2 to 3 pints; sheep, 3 to 6 ounces.

28. *Opium.*—Narcotic, sedative, anodyne, antispasmodic. Horse, 1-2 to 2 drachms; ox, 2 to 4 drachms; sheep, 10 to 20 grains.

29. *Opium, tincture laudanum.*—Narcotic, sedative, anodyne, antispasmodic. Horse, 1 to 2 ounces; ox, 2 ounces; sheep, 2 to 3 drachms. *Of the powdered drug*, give: horse, 1-2 to 2 drachms; ox, 2 to 4 drachms; sheep, 10 to 20 grains.

30. *Pepper, black.*—Stomachic, stimulant. Horse, 2 drachms; ox, 3 drachms; sheep, 1 to 2 scruples.

31. *Pumpkin seeds.*—Vermifuge, tæniafuge. Horse, 1 pint.

32. *Rhubarb.*—Laxative, tonic. Horse, 1 ounce; ox, 2 ounces; sheep, 1 drachm.

33. *Resin.*—Diuretic. Horse, 1 to 6 drachms; ox, 1-2 to 1 ounce; sheep, 2 to 4 drachms.

34. *Soap.*—Diuretic, antacid, laxative. Horse, 1 to 2 ounces; sheep, 2 to 6 drachms.

35. *Silver nitrate (lunar caustic).*—Nerve tonic. Horse, 5 grains; ox, 5 to 8 grains; sheep, 1 to 2 grains.

36. *Sweet spirits of niter, Spirits of nitrous ether.*—Stimulant, antispasmodic, diuretic, diaphoretic. Horse, 1 to 2 ounces; ox, 3 to 4 ounces; sheep, 3 to 6 drachms.

37. *Tobacco.*—Sedative, antispasmodic, vermifuge. Horse, 4 drachms; ox, 4 to 6 drachms; sheep, 1 drachm.

38. *Tar.*—Expectorant, antiseptic. Horse, 1-2 to 1 ounce; ox, 1-2 to 2 ounces; sheep, 1-2 ounce.

39. *Turpentine oil.*—Stimulant, antispasmodic, diuretic. Horse, 1 to 2 ounces; ox, 1 to 1 1-2 ounces; sheep, 1 to 2 drachms. Vermifuge: Horse, 2 ounces; ox, 2 to 3 ounces; sheep, 4 drachms.

40. *Valerian.*—Diffusible stimulant, antispasmodic, vermifuge. Horse, 2 ounces; ox, 2 to 4 ounces; sheep, 1-2 ounce.

41. *Wild cherry bark.*—Expectorant. Horse, 1 ounce; ox, 1 1-2 ounces; sheep, 3 drachms.

42. *Zinc, sulphate.*—Astringent, tonic. Horse, 1 to 2 drachms; ox, 2 to 3 drachms; sheep, 15 to 30 grains.

XXIII. Graduating Doses.

In the administration of medicines the following statement of ages and doses will be found valuable in determining quantities. The doses mentioned in the preceding list being full ones:

A horse of 3 years, ox 2 years, sheep 1 1-2 years and swine 15 months old, should have a full dose.

A horse 15 months to 2 years; cattle 1 to 2 years, sheep 9 to 18 months, and swine 8 to 15 months, 1-2 of a full dose.

A horse 9 to 18 months, cattle 6 to 12 months, sheep 5 to 9 months and swine 6 to 8 months, require 1-4 of a full dose.

A colt 5 to 9 months old, calves 3 to 6 months, lambs 3 to 5, and pigs 3 to 6 months old, may have 1-8 of a full adult dose.

Colts 1 to 5 months old, calves 1 to 3 months, lambs 1 to 3 months, and pigs 1 to 3 months old, may have 1-16 of the dose.

Nervous, excitable animals require less than others. The continued use of medicines renders their action slow and decreases their power. The influence of disease also checks or modifies action. In diseases of the brain, and spinal cord, and in impaction of the stomach, double

quantities must sometimes be given, while in low fevers one-half the usual quantity may produce evil, and sometimes prove fatal.

As a rule, anodynes, narcotics, sedatives, stimulants and anti-spasmodics may be repeated once in four hours until the required effect is produced.

Twice daily may be given as the rule for alteratives, refrigerants, tonics, diaphoretics and febrifuges.

Emetics should be repeated every five or ten minutes and their action induced by opening the mouth and irritating the throat with a feather. If the animal will drink, give large draughts of slightly warm water. Emetics are not given to horses.

Purgatives should not be given the second time until the first has had full time to operate. In the horse not before 36 hours; cattle and sheep 12 to 15 hours; swine in 7 to 10 hours.

Draughts of tepid water, or warm gruel assist the operation of purgatives.

A ball is not to be made round, but longer than it is wide and not larger than a walnut for horse or ox. It must be small enough so an animal may swallow it easily. Balls are made of drugs in powders mixed into a semi-solid state with honey or molasses and linseed meal, and covered with oiled tissue paper.

Drenches (liquid medicines) are made as infusions, with warm or cold water, or as decoctions with boiling water. Powdered substances not solvent in water are mixed with thick gruel or mucilage.

A ball is best given with the aid of a balling iron. This has been previously described. Put the iron between the front of the jaws, and place the ball well back on the tongue with the hand. Hold the head well up until swallowed. This may be aided by stroking the throat next the jaws.

Liquids are given from a horn or thick quart bottle with a pretty long neck, such as a champagne bottle. No liquid or irritating medicine should be given until sufficiently diluted with water so that it will not injure the mouth if held therein some minutes.

Oil of turpentine, croton oil, and other strong irritating substances that will not mix with water, should be mixed with palm or olive oil, milk beaten with eggs, or it may be given in mucilage as the case may require.

Powerful agents, that do not irritate, act promptly injected under the skin with a hypodermic syringe. A surgeon's advice should be used in administering them.

Injections are given with a horse syringe. There are patent injectors that pump in the liquid continuously. We have described an implement that works well, by gravity, and is easily made. Small syringes are used for injecting abscesses. Also the hypodermic syringe for injecting under the skin.

CHAPTER XX.

IMPLEMENTS AND APPARATUS.

What to Keep, and How to Use Them.

Catheter.—This is a round gutta percha tube, with one end open, the other rounded and near the end with two openings. Used to draw away the water when the horse is unable to pass it naturally. They are also introduced into deep ulcers, and liquid injected through them by means of a syringe. In using the catheter, it should be well oiled and carefully and slowly pushed along the orifice or canal.

Drawing knife.—Frog knife. The knife in common use by blacksmiths; a thin blade with a sharply-curved end fixed in a handle, and used in cutting into and paring the hoof.

Firing iron.—A heavy, blunt-edged blade fixed in a handle, and sometimes used for blistering when the actual cautery is considered necessary. Valuable in skillful hands.

Forceps.—These are pincers with long jaws, and used for extracting splinters, pieces of bone, or for seizing arteries in order to tie them up.

Knives.—These should be always keen and should be both sharp and round-pointed. A heavy bistoury is a long, narrow-bladed knife for opening deep wounds and abscesses.

Lancet.—These are of three kinds: the thumb lancet, the spring lancet and the fleam. The thumb lancet is gauged by the thumb, the spring lancet by a spring, and the fleam is struck by a hard wood stick. Always make the incision lengthwise of the vein.

Ligatures.—Cords for tying arteries, and in tying, a surgeon's knot should be used. Instead of passing the end of the cord once round the other, pass it twice around before drawing tight. It will hold securely.

Probes.—These are made of silver wire, with the ends slightly knobbed. They are useful in exploring wounds.

Rowel.—This is a ring of leather, an inch or so in diameter, the rim

being about a quarter of an inch wide. It is wrapped with flax or thread moistened with turpentine, and pushed down into a pocket made in the skin, to induce a running sore. They are little used now; setons accomplishing the object fully.

Setons.—A cord or ligature of leather thrust in, under and out of the skin, and tied. It is soaked with turpentine or smeared with irritating compounds, and turned every day, the object being to promote and keep up a discharge of pus, and reduce inflammation.

Seton needles.—These are broad, curved blades, with a round shaft eighteen inches long, and with an eye at the blunt end. Used for threading setons of tape, cord or leather into wounds made. Needles for sewing up wounds are of several sizes, curved, square needles.

Vents.—These are pledgets of tow, lint or other substances introduced into wounds to cause them to form matter. They should be moistened with Venice turpentine.

Twitch.—A loop of leather or strong cord, fastened securely upon a stout handle two feet long. Used for holding refractory horses, or during surgical or other operations. Pass the upper lip through the loop, and twist until sufficient force can be used to keep the animal still.

Hopples.—Ropes for casting a horse. They should be each twenty-five feet long. Have two strong straps of leather double, with a two inch seam between, and so they may be buckled tight to the fetlock. Fasten both ropes securely to the bottom of a collar placed on the horse's neck. Or if the rope is long enough, loop the middle to the collar; buckle a strap securely to each hind pastern, pass the ends of the rope through the rings, and back through the collar. One man manages the head to bring the horse down properly and easily, while assistants pull forcibly on the ropes ahead. A horse should never be cast except upon a thick, soft bed of straw or tan bark. If it is simply wished to hopple the horse, fasten the ends of the rope to the collar, and of such a length that the horse cannot kick.

Slings.—These are an apparatus to suspend a horse's weight in case of fracture, rheumatism, or other diseases when the animal cannot bear full weight on the limbs. First a broad strip of leather or strong canvas two feet wide and six or seven feet long, stiffened at the ends by being sewn around smooth billets of wood. To this a breeching is attached to pass around the buttocks, and others to and about the breast, to hold it securely. Loops must be fastened to the billets at the ends of the girdle of sufficient strength to bear the weight of the animal. Double blocks and pulleys are attached to these, suspended at proper points, and thus the animal is lifted and suspended so as to bear much or little weight on his limbs.

PART III.

CATTLE;

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

CATTLE.

CHAPTER I.

NATURAL HISTORY OF CATTLE.

THEIR ORIGIN——EARLY DOMESTICATION——THE DIFFERENT KINDS AND THEIR PECULIARITIES——IMPROVED BREEDS——DEVONS——SUSSEX——SHORT HORNS——ALDERNEYS——AYRSHIRES——HOLSTEINS——POLLED CATTLE——KERRY COWS——THE CHEROKEE OR TEXAS CATTLE, ETC., ETC.

The native country of the *genus Bos* is not known, and the wild type has long since passed away.

The Urus is regarded as the parent of domesticated cattle, and is described in its wild state, as an animal of enormous size, of great fierceness, and fable has thrown around it an air of mystery, as is common in all legends that have come down to us from the far past.

Domestication of Cattle.

The domestication of cattle is also a matter of conjecture.

Our earliest record comes from scripture. Jubal, the son of Lamech, who lived in the lifetime of Adam, is recorded as being "the father of such as have cattle."

Noah certainly had cattle, and wherever the sons of Noah migrated, they carried cattle with them.

Cattle were worshipped by the earliest Egyptians, and among the ancient nations of Judea, they were, and still are, held in great veneration.

In the days of Abraham, cattle certainly were regularly bred, and in the days of Jacob we have an account of systematic breeding to color, and probably to type.

In every civilized nation, the keeping of cattle forms among the earliest productive industries recorded, and every Celtic nation has at one time or another represented them as divinely given, or else, like the Hindoos, held them in the greatest veneration.

Scientific Nomenclature.

According to naturalists cattle belong to the CLASS *Mammalia*; that is, having mammæ or teats; their natural order is called *ruminantia*, from their habit of ruminating, or chewing the cud.

Their TRIBE is termed *bovidæ*, meaning the ox kind. The GENUS is *bos*, the ox; the horns growing, from the crest, projecting at first sideways, and porous or cellular inside, with a film of true horn encasing the cellular bony structure inside; the SUB-GENUS, which will form the subject of what we have to say, is termed *bos taurus*, or the domesticated ox.

Of these there are many families, or sub-families; each distinctive breed being a family. Mixed breeds, grades, and crosses, may be termed sub-families.

The Teeth.

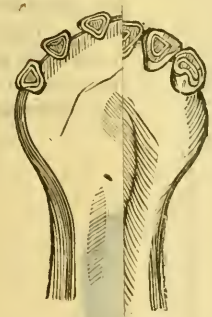
Cattle are distinguished as to their teeth by having eight lower incisors, and none upper; these are the cutting teeth. They have no canine teeth or tusks, but have twenty-four molars or grinding teeth; six on each side of the lower jaw, and six on each side of the upper jaw. The upper jaw has no incisors; but the skin upon which the lower incisors meet in the upper jaw is thickened, hard, and in aged animals almost horny. The teeth may be represented as follows; the figures above the line representing the upper, and the figures below the line representing the lower jaw:

$$\text{Cattle, incisors, } \frac{0}{8}, \text{ canines } \frac{0}{0}, \text{ molars } \frac{6\ 6}{6\ 6}. \quad \text{Total, 32 teeth.}$$

We annex a cut of a section of the lower jaw showing the eight incisors, of a mature ox, or at the age of five years.

F

Teeth of Calf at old, showing ab- two incisors, milk te except outside



Fi

Teeth at fifteen owing permanent sorption and wear it also shape from pers.

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CHART FOR ACCURATELY TELLING THE AGES OF CATTLE.

Fig. 1.

Teeth of Calf at Birth, showing the first two incisors, milk teeth.

Fig. 2.

Teeth at two weeks old, showing four temporary incisors.

Fig. 3.

Teeth at three weeks old, showing six incisors.

Fig. 4.

Teeth at one month old, showing eight incisors, or the full set.

Fig. 5.

Teeth at six to eight months old, showing wear on first two, or central teeth.

Fig. 6.

Teeth at ten months old, showing absorption in first two pairs of teeth, and wear of two outside pairs.

Fig. 7.

Teeth at twelve months old, showing absorption in all the nippers, except outside pair, and wear in these.

Fig. 8.

Teeth at fifteen months old, showing absorption and wear in all the temporary nippers.

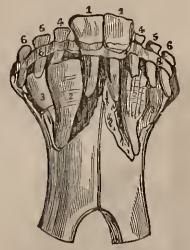

Fig. 9.

Teeth at eighteen months old, showing two first permanent incisors (1–1), and next two pairs (2–2 and 3–3), growing and pushing upwards toward the surface; also (4–4, 5–5 and 6–6) showing absorption. At (8–8) is shown the alveali, or cells for the teeth.

Fig. 10.

Teeth at two years old past, showing four permaneut incisors, and four temporary ones, absorption nearly complete; also marks of wear on two first pairs.

Fig 11.

Teeth at three years past, showing six permanent nippers, and two outside temporary ones nearly gone; also wear on two central pairs.

Fig. 12.

Teeth at four years past, showing eight permanent incisors — the full month — and complete complement; also wear on all but outside teeth.

Fig. 13.

Teeth at five years past, showing wear and dark marks.

Fig. 14.

Teeth at ten years old, showing permanent spaces between them; and also shapes from natural wear by use.

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For further facts concerning the Ages of Cattle see preceding pages.

Fig. 2.

Teeth at two weeks, showing temporary incisors.

Fig. 1.

Teeth of Calf at birth, showing the first two incisors, milk teeth.

Fig. 3.

Teeth at [illegible] two first permanent incisors (the two [illegible] and [illegible] the [illegible] [illegible] and [illegible]) showing [illegible] [illegible]

Fig. 8.

Teeth at fifteen months old, showing absorption and wear in all the temporary [illegible]

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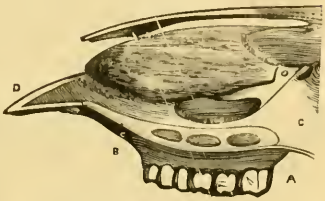
The annexed cut of section of the head of an ox will show the molars, or grinding teeth, and also the terminal bone of the upper jaw, corresponding to the lower face jaw, and destitute of teeth.

TEETH OF OX AT AGE OF FIVE YEARS.

Explanation.— *a*—Molars or grinders. *b*—Superior maxillary bone—its palatine process. *c*—Cells of the palatine bone. *d*.—Anterior maxillary bone, destitute of incisor teeth.

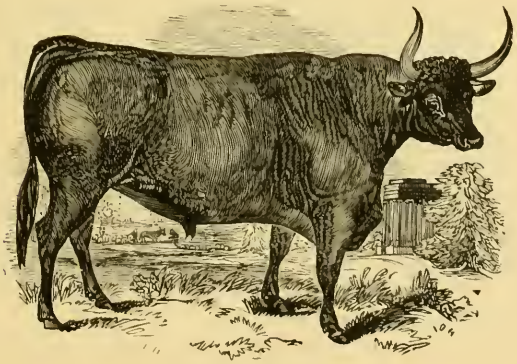
Breeds of Cattle.

The breeds of cattle which have acquired favor in the United States are confined to but few.



SECTION OF HEAD OF OX.

The Devons are the typical race of England, as among those that have retained their purity, through long generations, breeding with entire uniformity as to color, symmetry, horns, and other general characteristics, fully as much so as the Chillingham white cattle, which are regarded as descendants of the original or aboriginal cattle of the British Islands.



DEVON OX.

The foregoing cut is a good illustration of the Devon ox as he appeared fifty years ago, from the pasture. Such an one would be regarded as a most admirable animal to-day.

Classification of Races.

In England cattle are divided into beef and dairy cattle. Beef cattle again are divided into long-horns, middle-horns, short-horns, and polled or hornless cattle.

Long-Horns.

Of the long-horns; the old Irish long-horns showed a striking peculiarity, which was, that their horns turned directly downward.

In Craven, England, has long existed a breed of cattle peculiar in themselves, broad in the chine, quick and easy to fatten, and noted for making excellent beef.

Under the scientific breeding of Bakewell, a hundred years ago, and his immediate successor, Leicester, long-horns acquired a wide celebrity. This was undoubtedly attained by breeding in-and-in. He was known to have done so to a remarkable degree.

With the death of Bakewell and his immediate successors, excessive delicacy of constitution began to tell, and they began to lose caste years ago, as a race.

They have left their impress, however, and, most decidedly, upon the whole family of long-horns. They became better feeders, better handlers, and made better beef than before the infusion of this blood.

They have long been superseded by the short-horn and the Herefords, and are only noticed here, as forming a part of the mixed blood of cattle, of the United States and Canada.

We occasionally see by reversion, animals among our so called native cattle, showing strong characteristics of Leicester, Hereford, Devon, the old Teeswater, the Dutch and polled cattle.

Middle-Horns.

Of the Middle-Horns the only cattle valuable in the United States, are the Devons and the Herefords, both wonderful families, in their make up, and valuable whether for beef or working oxen.

In fact the Devon is the best working ox in the world, and as beef makers their flesh is superior to that of any other breed, except the Scotch, or West Highland cattle.

Besides the Devons the other families of the Middle-Horns, are the

Sussex, Pembroke, Glamorgan, *Angelsea*, and, in Scotland, the West Highland cattle, noted for the superiority of their flesh, and which have, for many generations, remained unchanged, or improved except by selection.

Their principal value, after all, is their extreme hardiness, and aptitude to fatten where other animals would starve.

Above, as showing the characteristics of this breed, we give an illustration of a West Highland ox, in good feeding flesh.

The Devons.

The celebrity that the Devons long ago attained for their superior beef and working qualities, is wholly due to the fact that they have long been bred, in North Devon, pure. Hence, they are often called North Devon, to distinguish them from the South Devons and the Sussex, both inferior cattle, either from a feeding or working standpoint.

The Devons are undoubtedly an original and pure race, and have been noted for their high excellence for many generations.

It is only within the last two hundred years that systematic efforts have been made to increase the excellence of English cattle, and it is not more than one hundred and fifty years ago that Devon farmers were waked up to the improvement, that might be made in these high strung, generous feeders. They have within the last seventy-five years been brought to such high perfection, that they do not suffer in comparison with other high caste cattle, and they would certainly suffer by intermixture with any other breed.

DEVON BULL.

Where Devons Thrive.

They cannot compete with the Short-Horns and Herefords, on flush western pastures.

They lack size, and early maturity, but on hill, or broken pastures, and in climates too cold for these breeds, and especially in climates unsuitable to Short-Horns, they are the best cattle ever known.

On the previous page, as showing the extraordinary symmetry and style of this remarkable breed, we present a likeness of a Devon bull, remarkable for eminent characteristics of the breed.

Devon Cows.

The bulls of this breed are inclined to be vicious as they get old. The cows are gentle, and if gently used, kind in the extreme. Both males and females, however, are so high strung that they will not bear abuse. A brutal master they will fight, but if managed with a firm, yet gentle hand, they are the most familiar, as they are the most intelligent, of horned cattle.

The cows give exceedingly rich milk, and many of them fair quantities.

The males are said to cross kindly with the Guernseys, and these make valuable dairy cattle.

There are however now so many excellent pure breeds of milkers that it would be futile to experiment with the cross, since it will surely reduce the value of the animal either for work or beef.

As workers, milkers and beef makers combined, for the amount of food taken, they have no superior, if they have their equal. As beef makers alone, in the West, the Short Horns and Hereford are superior. As milkers the Jersey, the Holstein and Ayrshire take the palm. As working cattle the Devons are superior to all known breeds.

The cut on the following page is a good illustration of a high caste Devon cow.

Characteristics of the Devon Cow.

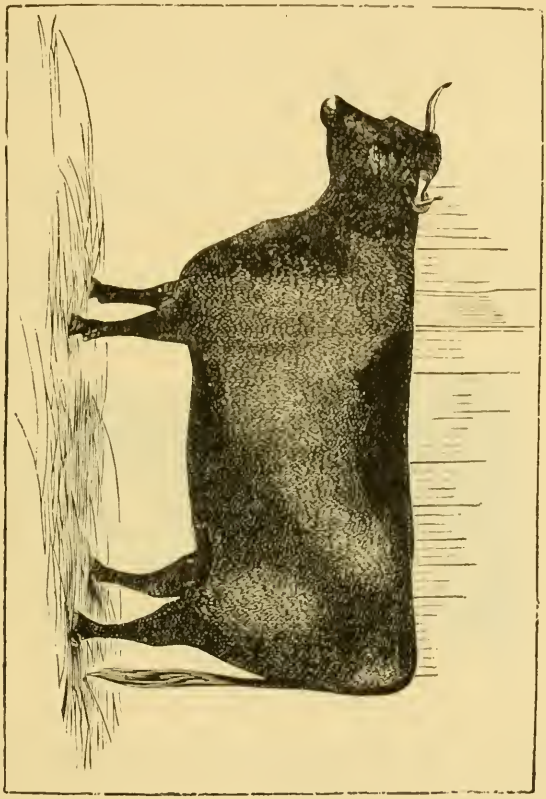
This we give as follows:

There are few things more remarkable about the Devon cattle than the comparative smallness of the cow. The bull is a great deal less than the ox, and the cow smaller than the bull.

This is some disadvantage, and the breeders are aware of it; for, although it may not be necessary to have a large bull, and especially as those of an extraordinary size are seldom handsome in all their points, but somewhere or other present coarseness or deformity, it is almost

impossible to procure large and serviceable oxen except from a somewhat roomy cow.

These cows, however, although small, possess that roundness and projection of the two or three last ribs, which make them actually more roomy than a careless examination of them would indicate.



NORTH DEVON COW.

The cow is particularly distinguished for her full, round, clear eye, the gold-colored circle around the eye, and the same color on the inside skin of the ear.

The countenance is cheerful, and the muzzle orange or yellow.

The jaws are free from thickness, and the throat from dewlap.

The back, the barrel, and the hind quarters differ from those of other breeds, having more of roundness and beauty, and being free from angles.

Points of the Devons.

Youatt, than whom none have written more intelligently on domestic animals, describes the characteristics of the breed as follows:

The more perfect specimens of the Devon breed are thus distinguished:

The horn of the *bull* ought to be neither too low nor too high, tapering at the points, not too thick at the tip.

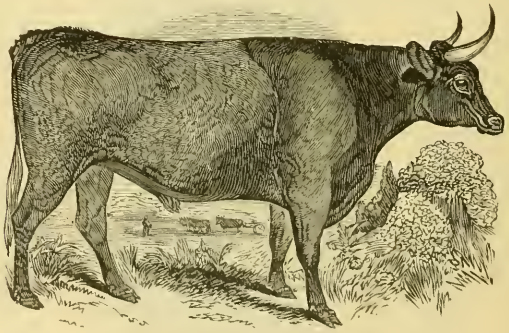
The eye should be clear, bright, and prominent, showing much of the white, and have around it a circle of dark orange color.

The forehead should be flat, indented, and small, for, by the smallness of the forehead, the purity of the breed is very much estimated.

The cheek should be small, and the muzzle fine; the nose must be of a clear yellow.

The nostril should be high and open; the hair curled about the head.

The neck should be thick, and that sometimes almost to a fault.



DEVON WORKING OX.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule.

The head of the ox is small, very singularly so, relatively to his bulk; yet it has a striking breadth of forehead; it is clean and free from flesh about the jaws.

The eye is very prominent, and the animal has a pleasing vivacity of

countenance, distinguishing it from the heavy aspect of many other breeds.

Its neck is long and thin, admirably adapting it for the collar, or the more common and ruder yoke.

It is accounted one of the characteristics of good cattle, that the line of the neck from the horns, to the withers, should scarcely deviate from that of the back.

In the Devon ox, however, there is a peculiar rising at the shoulder, reminding us of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished.

It has little or no dewlap depending from the throat.

The horns are longer than those of the bull, smaller, and fine even to the base, and of a lighter color, and tipped with yellow.

The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers.

The fore legs are wide apart, looking like pillars that have to support a great weight.

The point of the shoulder is rarely or never seen. There is no projection of bone, but there is a kind of level line running on to the neck.

Characteristics and Important Points.

Angular bony projections are never found in a beast that carries much flesh and fat.

The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply strength, speed, and aptitude to fatten.

A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devon ox, there is a point about him, disliked in the blood or riding horse, and not approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in *catching times*, and the division of whose foot prevents him from stumbling.

The lightness of the other parts of his form, however, counterbalances heaviness there.

The legs are straight, at least in the best herds. If they are in-kneed or crooked in the fore-legs, it argues a deficiency in blood, and comparative incapacity for work: and for grazing, too, for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be

thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The Limbs of the Devons.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder.

Below the knee the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone; the leg is deep, and the sinews are far removed from the bone, promising both strength and speed.

It may be objected that the leg is a little too long. It would be so in an animal destined only to graze; but this is a working animal, and some length of leg is necessary to get him actively over the ground.

The Body of the Devons.

There is some trifling fall behind the withers, but no *hollowness*, and the line of the back is straight from thence to the setting on of the tail. If there is any seeming fault in the beast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

The two last ribs are particularly bold and prominent, leaving room for the stomach and other parts concerned in digestion to be fully developed.

The hips, or huckles, are high up, and on a level with the back, whether the beast is fat or lean.

The hind quarters, or the space from the hip to the point of the rump, are particularly long and well filled up—a point of importance both for grazing and working. It leaves room for flesh in the most valuable part, and indicates much power behind, equally connected with strength and speed. This is an improvement quite of modern date. The fullness here, and the swelling of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.

The setting on of the tail is high, on a level with the back, rarely much elevated or depressed. This is another great point, as connected with the perfection of the hind quarters.

The tail is long and small, and taper, with a round bunch of hair at the bottom.

Of the Skin and Hair.

The skin of the Devon, with his curly hair, is exceedingly mellow and elastic. Graziers well know that there is not a more important point than this. When the skin can be easily raised from the hips it shows that there is room to set on fat below.

The skin is thin rather than thick. Its appearance of thickness arises from the curly hair with which it is covered, and curly in proportion to the condition and health of the animal. These curls run like little ripples on water. Some of these cattle have the hair smooth, but then it should be fine and soft. Those with curled hair are more hardy, and fatten more kindly.

The favorite color is blood red. This is supposed to indicate purity of breed; but there are many good cattle approaching almost to bay.

If the eye is clear and good, and the skin mellow, the paler color will bear hard work, and fatten as well as others, but a beast with pale hair, and hard under the hand, and the eye dark and dead, will be a sluggish worker, and an unprofitable feeder.

Those of a yellow color are said to be subject to diarrhœa, or scouring.

These are the principal points of a good Devon ox; but he used to be, perhaps as many are yet, a little too flat-sided, and the rump narrowed too rapidly behind the hip bones; there was too much space between the hip bones and the last rib, and he was too light for plowing in tenacious and strong soils.

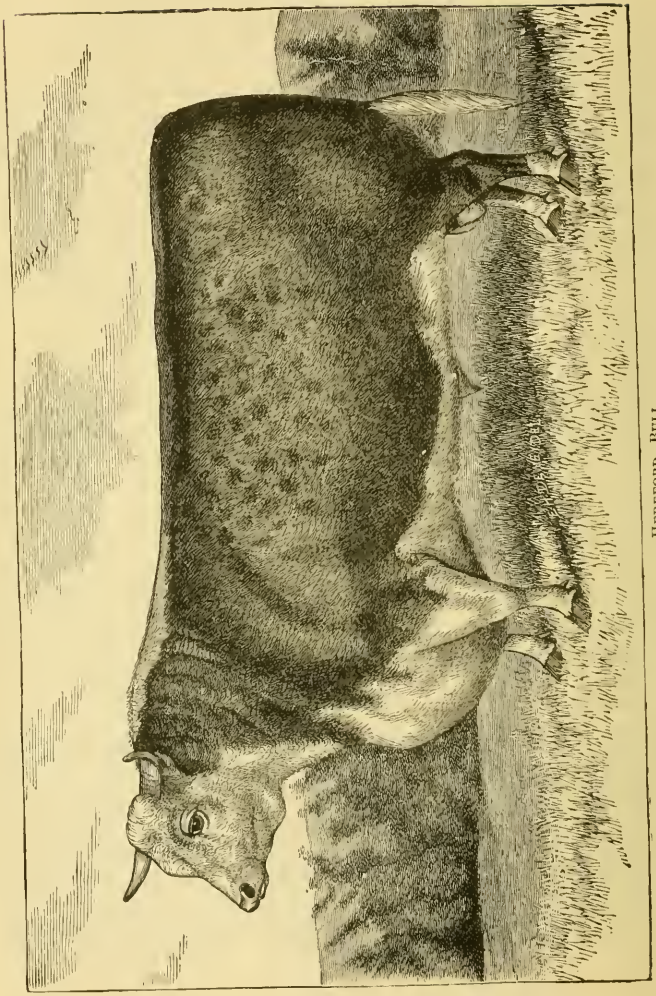
A selection from the most perfect animals of the true breed—the bone small and the neck fine, but the brisket deep and wide, and down to the knees, and not an atom of flatness all over the side—these have improved the strength and bulk of the Devon ox, without imparing, in the slightest degree his activity, his beauty, or his propensity to fatten.

The Herefords.

The Herefords, named from the county of Hereford, England, were originally red or brown, with no white about them. From that they were bred to brownish or yellowish red, some few even being brindle. Only within the last hundred years have they been bred to white faces.

It was finally made to extend along the top of the neck, along the throat, dewlap, brisket and fore legs, belly and flanks; and white hind feet and tail are now fashionable.

They are a very ancient breed, and undoubtedly allied to the Devons.



HEREFORD BULL.

Herefords Fifty Years Ago.

Mr. Marshal, a most competent authority, gives the following account of the improved Hereford as it was known fifty years ago:

"The countenance pleasant, cheerful, open; the forehead broad; eye full and lively; horns bright, taper, and spreading; head small; chop lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide, at the neck; rump even with the level of the back, and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel; the hind parts large and full of strength; neck bones snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh every where mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright, and silky; color, a middle red; this, with a bald face, is characteristic of the true Hereford breed."

The Hereford Cow.

The Hereford cow compared with the ox is small and delicate, and not always handsomely made, to the superficial observer.

Here again this breed would seem to show their relationship to the Devon. She carries but little flesh, in breeding condition, and when breeding, should not be fed sufficiently to accumulate much fat; for, in order that the young be superior, the dam should have plenty of room inside.

With the Herefords, experience has shown that the dam may not be too large or coarse but she should be roomy. Then the breeder will get, even from apparently inferior cows, large, handsome steers, that will fatten early, and kindly, and to great weights.

When the cow is done breeding, and ready for fatting, it will please the owner to see how she will spread out, and accumulate flesh and fat, and this to a greater degree, than if not allowed to breed.

The Herefords are a hardy, gentle race, maturing early, and are long lived. The flesh is superior, handsomely marbled, heavy in the prime parts, and they fatten to weights fully as heavy as any other known breed.

Their massive strength, honesty and gentleness make them the best working oxen known, and the potency of the bulls, when crossed upon

red or nearly red cows of the country, renders the steers easily matched in color, as they will be easily matched in general characteristics of the progeny.

Herefords in America.

Herefords were first brought to America for systematic breeding in 1816 or 1817, by the great Kentucky statesman, Henry Clay. They were soon, however, allowed to run down and were at length entirely lost sight of there. Admiral Sir Isaac Coffin, a few years after, sent out from England a Hereford bull to his friends in Massachusetts, which was used in crossing upon the native cattle of the State. He made a very marked impress there, and for many years the good result was seen in the cattle of the State.

About the year 1840 there was a large importation made into the State of New York, from England. They went principally to Jefferson county and some to Vermont.

About the year 1852 there was another considerable importation of Herefords into Ohio—very fine animals, where they, in connection with later importations, have been successfully bred.

In 1860 and 1861 two importations were made into Canada, consisting of two bulls and eleven cows and heifers. From these there have come down many most excellent animals, which have left their impress far and wide. Since that time there have been various importations, principally in Illinois and Maryland, the produce of which have fought their way against the opposition of the Short-Horns, until now they may be said to fairly divide honors with this famous breed in America as they are well known to do in England.

As Milkers.

The cows are not very deep milkers, in fact they give but little milk. They were never large milkers, and a course of breeding for many generations as beef makers, while it has brought up the animals to great weights and such wonderful symmetry that they fairly dispute the palm in the showrings with the best Short Horns, the milking qualities have gradually become less and less. It is but another exemplification of the fact, that all goodness cannot be combined in one animal. No sensible breeder expects it.

It is enough that the science of breeding within the last fifty years has brought all our domestic animals far toward perfection, in the two great classes needed in cattle: that is, superior excellence as beef makers, or else superior excellence as deep and rich milkers. It is obvious that it must be so, for the animal superior as a milker must necessarily be altogether different in her conformation from one destined to produce a maximum weight of prime beef at the earliest age.

HEREFORD COW AND CALF.

The Hereford Ox.

Whether we consider this remarkable breed either in their adaptability to heavy draft, or in their wonderful fattening qualities, it is the steers that make the money for the feeder.

Their capability of standing fatigue and constitutional adaptability in resisting winter weather, has of late made them great favorites with the ranchmen on the plains.

So, while we see them winning honors in the show rings at home, the young bulls are eagerly picked up for transportation to Colorado, New Mexico, Montana and Wyoming, to put with the herds there, for the purpose of breeding grades.

Thus two valuable ends will be conserved: That country will send East most superior cattle for feeding fat, in the great corn region of the West, while at the same time they will be raising up steers admirably adapted to the heavy freighting business in the mountains and mining districts.

The Hereford of To-day.

As showing the extreme care that has been exercised of late years in improving this comparatively rare breed in England, to such great perfection as to fairly claim honors with the very best Short-Horns, the following extracts from leading agricultural journals, relating to one of the great show rings there in 1878, the Bath and West of England, the *Mark Lane Express* speaking of the Hereford exhibit says:

"They are not so numerous as the more fashionable breed, but the quality throughout is excellent. In the aged bull class there are five animals of which the Hereford men need not be ashamed. * * *

"The heifers in milk or in calf numbered only three, but two of them were such animals as it was worth while coming to Oxford on purpose to see. Mrs. Sarah Edwards, of Wintercott, took first and second, leaving Mr. Lutley the reserve; but Mrs. Edwards' Leonora is one of the most perfect animals that has been shown for years. It was first last year as a yearling at Liverpool, and will likely be first wherever it goes. The champion prize given by the Oxfordshire Agricultural Society was also awarded to this heifer as the best female horned animal in the yard. The companion heifer, Beatrice, is also very handsome, and took second to Leonora's first at the Royal last year, as it did last week at Oxford. Mrs. Edwards may well be proud of such stock as that; if Leonora had been a Grand Duchess Short-Horn a poem would have been composed in her honor, and translated into several languages by this time. But no Short-Horn that we have ever seen was cast in such a mould as this Hereford heifer."

In the *Agricultural Gazette* (London) we find the following:

"This breed enjoyed the remarkable distinction of producing both the champion animals at Oxford. Mr. Aaron Rogers' Grateful being declared to be the best bull, and Mrs. Sarah Edwards' Beatrice (a two year old heifer) being declared to be the best cow or heifer in the yard. Both, as may be supposed, were very good, the heifer pre-eminently so. She is a daughter of the famous bull, Winter de Cote, and another instance of hereditary merit.

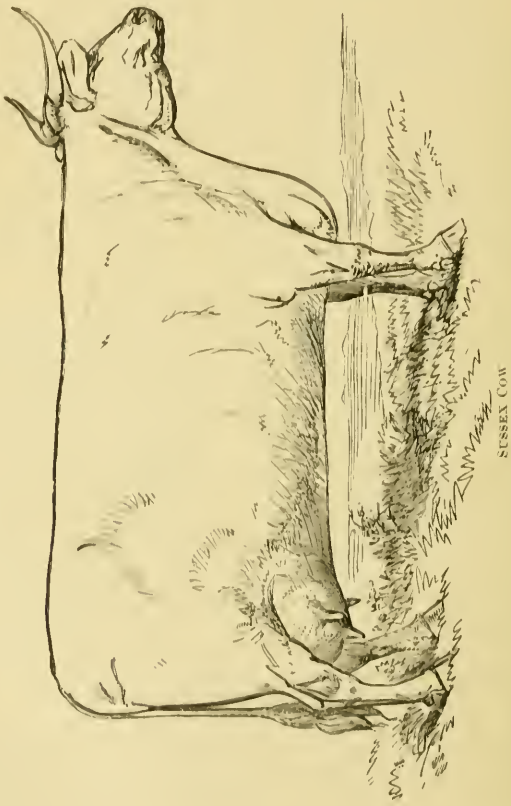
"The yearling heifers and calves indicate that this breed is, as beef makers at an early age, quite up to the highest Short-Horn standard. The Teeswater may milk better, and be more ready in adapting itself to local circumstances; but where the pasture is good, it is hard to beat the white-faces for grazing."

The *Chamber of Agriculture Journal* (London) also says:

"The old bull Hereford class produced an extraordinary animal in Mr. Aaron Rogers' Grateful, who secured the reserve at the Hereford Show in 1876, but did not make his appearance at Bath or Liverpool last year. He has made wonderful development since, appearing as a two-year-old, as is proved by the fact that Thoughtful, who was then placed above him, and has since taken firsts at Birmingham, Liverpool and Bath, has now been put second to him; and that not only was he selected by the judges as the best Hereford bull on the ground, but in the contest for the championship succeeded in carrying it off against such a Short-Horn competitor as Sir Arthur Ingram. This is no slight honor to the Hereford breed, and of course any animal counted worthy of such a distinction must be a first-class one. Grateful, at four years old, has capital loins and chines, with great thickness and depth of frame, and is very level all over; but his grand feature is the astounding mass of flesh with which his frame is covered. His girth is eight feet ten and one-half inches. Thoughtful has frequently been described in these columns, and it is sufficient to state that he is a massive, grand bull, who well supports his merit. The next class was a very weak one, only consisting of two, and those not so good as the herds of Mr. H. N. Edwards and Mr. Philip Turner are accustomed to supply.

"In the cow class the late Mr. Warren Evans' Lady Blanche, which took second prize at Bath, now came to the front position. She is marvelous at her fore flank, and displays a great mass of flesh on a well-shaped, grand frame, which, however, fell off slightly at the rump. The second prize cow, Mr. E. J. Lewis' Little Beauty, had a highly commended at Bath, and wonderfully retains her show-yard merit at eleven years old. The two-year-old heifers of Mrs. Sarah Edwards, Leonora and Beatrice, were, of course, sure to win. Beatrice has recently reared a calf, which

is slightly against her for showing; but Leonora is in full bloom with her beautiful head, symmetrical form, and all that loveliness which is so taking to the eye. After being selected as the best Hereford female on the ground, she carried off the champion prize against a remarkably



SUSSEX COW.

shapely Short-horn heifer, and one of the best Devons that has appeared for years, so that both cups were awarded to Herefords."

Sussex Cattle.—Distinguishing Marks.

This breed is closely allied to the Devons, but coarser. Their distinguishing marks are:

The horns are more tapering, pushing farther forward, and turning up more. The head is small and well formed, the eye full, large and mild in the ox, but rather wild and unquiet in the cow. The throat is clean and the neck long and thin, but coarser than in the Devon. The shoulder is wider and rounder on the withers; straighter from the top of the withers towards the back, and carries much flesh, giving too much weight to unprofitable parts. On the other hand, the barrel is round and deep, the back straight, and the back-bone entirely hidden by the muscles on each side. The heart and lungs are full and large, and the belly and flank capacious. The barrel is well-ribbed home. The loins are wide, the hip-bone low, free from raggedness, large, and well spread, and the space between the hips well filled up. The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fullness within.

In color the Sussex is a deep chestnut red, or blood bay. They are all lighter in color than the Devon, but in color they are fully as uniform.

The Sussex Cow.

The cows have fine hair, a mellow, rather than thin skin; a small teat; horns fine, clean, and transparent, which reach forward from the head and turn up at the tips; the neck is thin and clean; back and belly straight; ribs round and springing out well; shoulder flat, but projecting at the point.

Hips and rump wide; the tail set on level with the rump, and the carcass large; the legs are rather short and fine.

The cows are not good milkers; they are often uneasy in the pasture, and as before stated, unquiet in temper.

They have been, some of them, imported to the United States and even exhibited and sold as Devons.

This description of the Sussex is given for this reason: Those who buy Devons should be careful that they have no stain of this blood; in other words, their pedigree should be perfect.

Short-Horned Breeds.

The Short-Horn breeds of England are represented by the Durham, the Yorkshire, the Lincolnshire, the Teeswater and the Holderness breeds.

DURHAM BULL AND COW, OLD STYLE.

The Yorkshires and Lincolnshires are now but little known, being superseded by the improved breed now generally known and recognized by the name of Short-Horn, or the crosses thereof.

Their characteristics were those in a modified degree of the old Durham and Teeswater cattle.

Short-Horns Proper.

The only representation of this class worthy of notice here, are the descendants of the old Durham or Teeswater cattle, which have existed in the counties of Durham and York, from the earliest historical periods. These uniformly had short horns, were of large size, and were extraordinary milkers.

As to their characteristics, they were thin-skinned; sleek-haired; rather delicate in constitution; not mellow to the touch; coarse in offal; defective in girth forward; slow to fatten; the meat inferior, and often of a dark hue.

Excellence in the aptitude of the Short-Horns of latter years to fatten, early maturity, and mellowness of hide, go back almost one hundred and fifty years, when the Short-Horns, on the banks of the river Tees, (and hence called the Teeswater breed), began to assume the distinctive characteristics of the Short-Horns of a later period.

Short-Horn History.

Whatever may have been the origin of the cattle from which have descended the present race of Short-Horns, it is not of moment here. It is enough to know that they had been for many generations bred sufficiently pure to establish certain characteristics that attracted the most eminent breeders of the day.

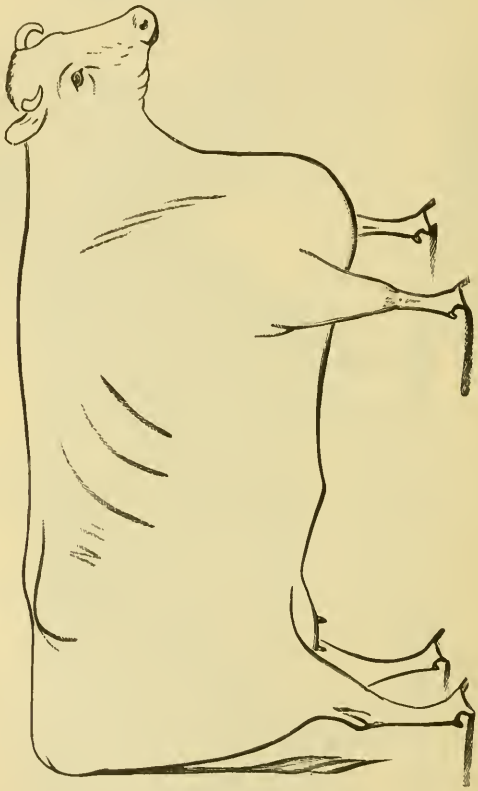
Among the breeders of the latter part of the last century, and the early part of the present century, were the Collings, (Charles and Robert), Sir Henry Vane, Col. John Trotter, and Mr. Mason.

In the early years of the present century, Mr. John Stevenson, Mr. Bates, and Mr. Booth, each became celebrated for the eminence of their animals. Earl Spencer also acquired a great reputation, as the possessor of extraordinary animals, and for prices received by himself and Mr. Bates.

Since the death of the latter gentleman in 1849, Short-Horns have steadily increased in price for fashionably bred animals, running far into thousands of dollars, of late years, for a single animal, while those not so fashionably bred were equally sought at prices that would have seemed large fifty or sixty years ago.

Below may be found an outline representation of a Short-Horn cow, fat.

It will be observed that this animal carries great size, a square body of great substance, while the legs are sufficient for locomotion, although from the fullness of the carcass they seem short, and that there is abundance of meat in the prime parts, including the thighs, which carry their



SHORT-HORN COW, IN OUTLINE.

fullness well down to the hocks. It will be seen that she is characterized by massiveness, smoothness, and that she shows the appearance of carrying light offal. The brisket is deep, the udder small, but compact, and

extending well forward. The rump is smooth, but broad, and without patchiness—that is, great lumps of fat standing out like blubber. The hips are broad and well covered with flesh and fat; and the loins, and indeed the whole top, exceptionally good. In fact, she is an animal carrying beef all over, where flesh may be laid on, and full of fat inside. She is a grand representative of the breed, and one that may be fattened to a great weight.

Short-Horns in America.

Mr. Allen, the editor of the American Short-Horn Herd Book on American cattle, from a very exhaustive research of importations in relation to the introduction of this most valuable breed into the United States, says:

Soon after the termination of the Revolutionary war with England, a few cattle supposed to be pure Short Horns, were brought into Virginia by a Mr. Miller. These were said to be well fleshed animals, and the cows remarkable for milk, giving as high as thirty-two quarts in a day. Some of the produce of these cattle, as early as 1797, were taken into Kentucky by a Mr. Patton, where, as little was known of "breeds," they were called, after the gentleman who brought them, the "Patton stock." They were well cared for, and made a decided improvement in the cattle of the "blue grass country," where they were first introduced. Some of this early Virginia stock also went out to the "south branch of the Potomac," in that State, a fine grazing country, which, fifty years ago, was famous for its good cattle. In the year 1796, it is said that an Englishman, named Heaton, brought two or three Short Horn cattle from the north of England to New York. They were taken to Westchester county, near by, and bred, but no results, in *pure* blood, have been traced to them.

In 1815-16, a Mr. Cox, an Englishman, imported a bull and two heifers into Rensselaer county, New York. These were followed in 1822 by two bulls, imported by another Englishman named Hayne. Descendants from this Cox stock were said to be bred pure, and afterwards crossed by Mr. Hayne's bulls. The stock now exists in considerable numbers and of good quality, in that and adjoining counties.

In 1817 Col. Lewis Sanders, of Lexington, Kentucky, made an importation of three bulls and three heifers from England. They were of good quality and blood, and laid the foundation of many excellent herds in that State. In 1818, Mr. Cornelius Cooledge, of Boston, Massachusetts, imported a yearling heifer,—"Flora"—and a bull—"Cicero"—into that city, from the herd of Mr. Mason, of Chilton, in

the county of Durham, England. These were carefully bred, and many of their descendants are now scattered throughout several States. About the same year Mr. Samuel Williams, then a merchant in London, but a native of Massachusetts, sent out a bull—"Young Denton"—and some cows of the same and later importations, and their descendants are still numerous among well bred Short Horns of the present day.

The same year, Mr. Gorham Parsons, of Brighton, Massachusetts, imported a Short Horn bull—"Fortunatus"—bred by Geo. Faulkner, of North Allerton, Yorkshire, England. He was used considerably on the native cows of his State, but we have never traced any thorough-bred pedigrees to him.

In 1820, Mr. Theodore Lyman, of Boston, Massachusetts, imported a bull, which he sold to Israel Thorndike, of that city, and he sent him to his farm in Maine. Of his produce we hear nothing.

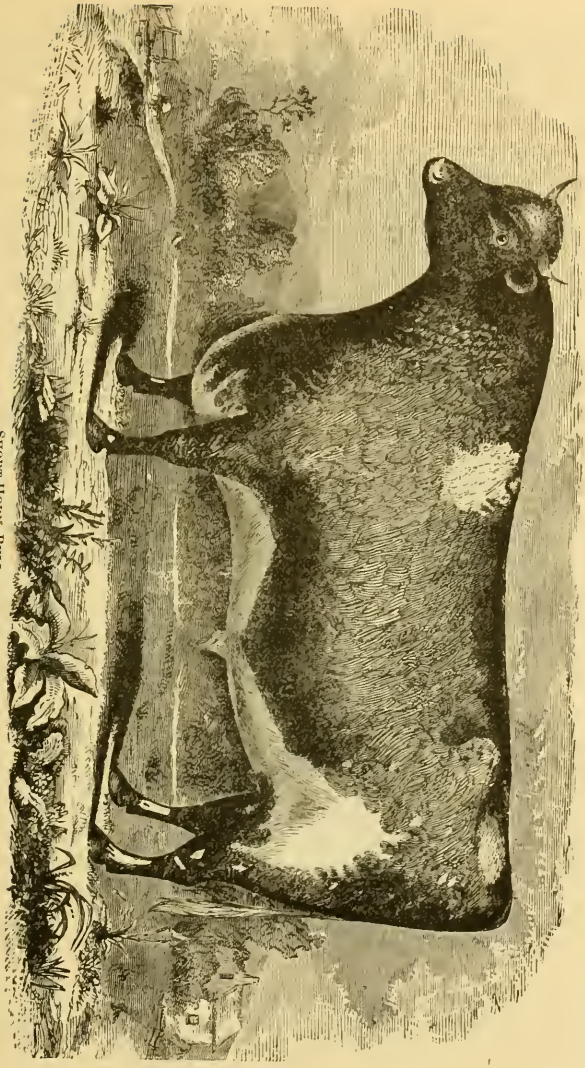
About the year 1820, and during a few years succeeding, several spirited gentlemen of Boston, and its neighborhood, imported a number of cows and bulls from some of the best herds in England. They were Messrs. Derby, Williams, Lee, Prince, Monson, and perhaps others. These were all fine cattle, and of approved blood in the English Short-Horn districts. Their descendants are still numerous in New England, and some other States.

About the year 1823, the late Admiral Sir Isaac Coffin, of the British navy, a native of Massachusetts, sent out a cow—"Anabella"—and a bull—"Admiral"—as a gift to the Massachusetts Agricultural Society. They were good animals, and bred with the other Massachusetts importations.

Shortly previous to 1821, the late John S. Skinner, of Baltimore, Maryland, imported for Governor Lloyd, of that State, a bull—"Champion"—and two heifers—"White Rose" and "Shepherdess"—from the herd of Mr. Champion, a noted English breeder. From these, several good animals descended, some or which are now known.

In 1823, Mr. Skinner also imported for the late Gen. Stephen Van Rensslær, of Albany, New York, a bull—"Washington"—and two heifers—"Conquest" and "Pansey"—from the same herd of Mr. Champion. Conquest did not breed; Pansey was a successful breeder, and many of her descendants are now scattered over the country.

During the years 1822 to 1830, the late Mr. Charles Henry Hall, of New York, imported several Short-Horn bulls and cows, from some of the best English herds. Several of these he sold to persons in the neighborhood of that city, soon after they arrived, and others he sent to his farm in Rensselær county, near Albany, and there bred them. Their descendants are now scattered through several good herds.



SHORT-HORN BULL.

In 1824 the late Col. John Hare Powell, of Philadelphia, Pa., commenced importations, and for several years continued them with much spirit and judgment. His selections were principally from the herds of Jonas Whitaker, of Otley, in Yorkshire, England. He bred them assiduously at his fine estate at Powelton, near the city, and sold many to neighboring breeders, and to go into Ohio and Kentucky, where many of their descendants still remain.

About the year 1828, Mr. Francis Rotch, then of New Bedford, Mass., selected from the herd of Mr. Whitaker, and sent to Mr. Benj. Rodman, of New Bedford, a bull and three heifers. They were afterwards sold to other breeders, and their descendants are now found in several excellent herds.

In the year 1833, the late Mr. Walter Dun, near Lexington, Ky., imported a bull and several valuable cows from choice herds in Yorkshire, England. He bred them with much care, and their descendants are now found in many good western herds.

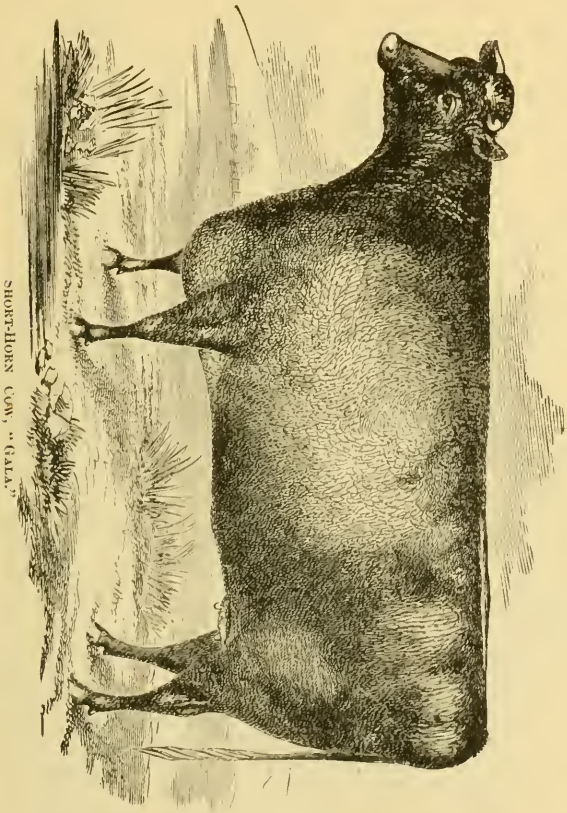
But the first enterprise in importing Short-Horns upon a grand scale was commenced in 1834, by an association of cattle breeders of the Scioto Valley, and its adjoining counties, in Ohio. They formed a company, with adequate capital, and sent out an agent, who purchased the best cattle to be found, without regard to price, and brought out nineteen animals in one ship, landed them at Philadelphia, and drove them to Ohio. Further importations were made by the same company, in the years 1835 and 1836. The cattle were kept and bred together in one locality, for upwards of two years, and then sold by auction. They brought large prices—$500 to $2,500 each—and were distributed chiefly among the stockholders, who were among the most extensive cattle breeders and graziers of the famous Scioto Valley.

In 1837-8-9, importations were made into Kentucky, by Messrs. James Shelby and Henry Clay, Jr., and some other parties, of several well-selected Short-Horns, some of which were kept and bred by the importers, and the others sold in their vicinity.

In 1837-8-9, Mr. Whitaker, above mentioned, sent out to Philadelphia, on his own account, upwards of a hundred Short-Horns, from his own and other herds, and put them on Col. Powell's farm, where he sold them at auction. They were purchased at good prices, mostly by breeders from Pennsylvania, Ohio, and Kentucky, and distributed widely through those States.

From 1835 up to 1843, several importations of fine stock were made by Mr. Weddle, an English emigrant, to Rochester, N. Y., and by American gentlemen, among whom were Messrs. E. P. Prentice, of Albany, N. Y., Mr. James Lenox and Mr. J. F. Sheaffe, of New York city,

Messrs. LeRoy and Newbould, of Livingston county, the late Peter A. Remsen, of Genesee county, N. Y., and Mr. Whitney, of New Haven, Ct., Mr. Gibbons, of New Jersey, and some others, not now recollected, —all valuable animals. They were bred for some years by their owners,



SHORT-HORN COW, "GALA."

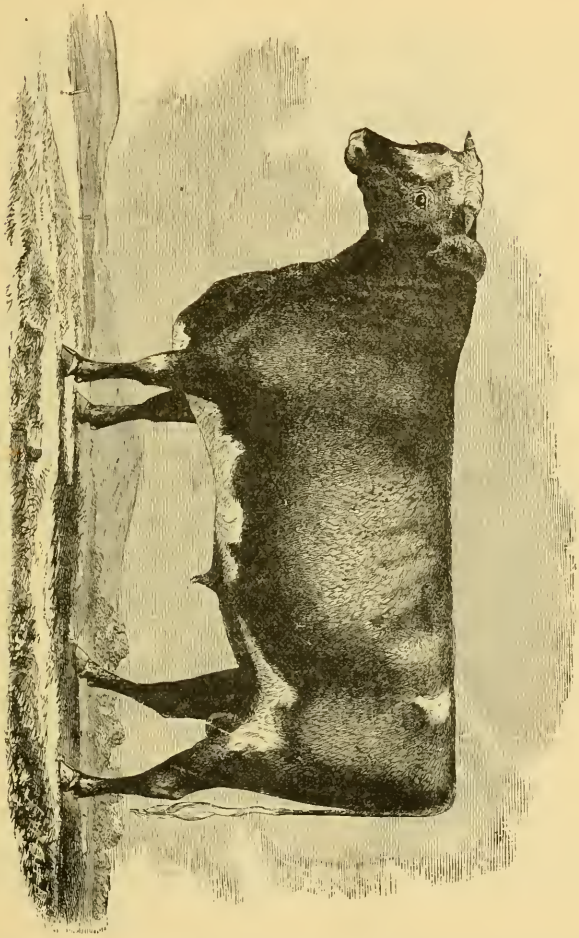
with much care. Mr. Prentice, for several years, had a large and excellent herd on his home farm. After some years all these herds were sold and widely distributed. Their descendants still remain among our valuable herds.

In the year 1849-50, Col. J. M. Sherwood, of Auburn, and Mr. Ambrose Stephens, of Batavia, N. Y., imported from the herd of Mr. Bates a bull, and from Mr. Jno. Stephenson, of Durham, England, three bulls and several heifers, all choice animals, and successfully bred them during several years. The stock became widely distributed, and well known.

About the year 1839, Mr. George Vail, of Troy, N. Y., made an importation of a bull and heifer, purchased of Mr. Thomas Bates, of Kirkleavington, the first cattle from that particular herd which had been introduced into the State. A few years later, he purchased and imported several more cows from the herd of Mr. Bates, crosses of his "Duchess" and other families. He bred them with success and widely distributed their blood. Mr. Vail made a final sale of his herd in the year 1852.

A period of some years now occurred, in which few more, if any, Short-Horns were imported. Cattle, as well as all kinds of agricultural produce, were exceedingly low; but as things grew better, the demand for "blood" cattle revived, and the spirit for their breeding was renewed. Mr. Thomas Bates, a distinguished Short-Horn breeder in England, died in 1849. His herd, fully equal in quality to any in England, was sold in 1850. The choicest of them—of the "Duchess" and "Oxford" tribes—fell mostly into the hands of the late Lord Dacie, at Fortworth Park, already the owner of a noble herd, to which the Bates stock was added. He was a skillful breeder, and of most liberal spirit, and during the brief time he held them the reputation of the Bates stock, if possible, increased. Within three years from the time of the sale of Mr. Bates' herd, Lord Dacie died. In 1853, peremptory sale of his stock was widely advertised. Allured by the reputation of his herd, several American gentlemen went over to witness it. The attendance of English herders was very large, and the sales averaged higher prices in individual animals than had been reached since the famous sale of Charles Colling, in 1810. Mr. Samuel Thorne, of Duchess county, N. Y., bought several of the best and highest priced animals, of the "Duchess" and "Oxford" tribes, and added to them several more choice ones, from different herds. Messrs. L. G. Morris, and the late Noel J. Becar, of New York, bought others of the "Duchess", and "Oxfords," to which they added more from other choice herds. These were all brought over here, and bred. Mr. Ezra Cornell, of Ithaca, and Mr. James O. Sheldon, of Geneva, N. Y., soon afterwards made some importations, and obtained some of the "Bates" blood also. The late Gen. James S. Wadsworth, and other gentlemen of the Genesee Valley, N. Y., also made importations. These "Bates" importations have since been bred so successfully by their holders here, that several young bulls and heifers, bred by Mr. Thorne and Mr. Shel-

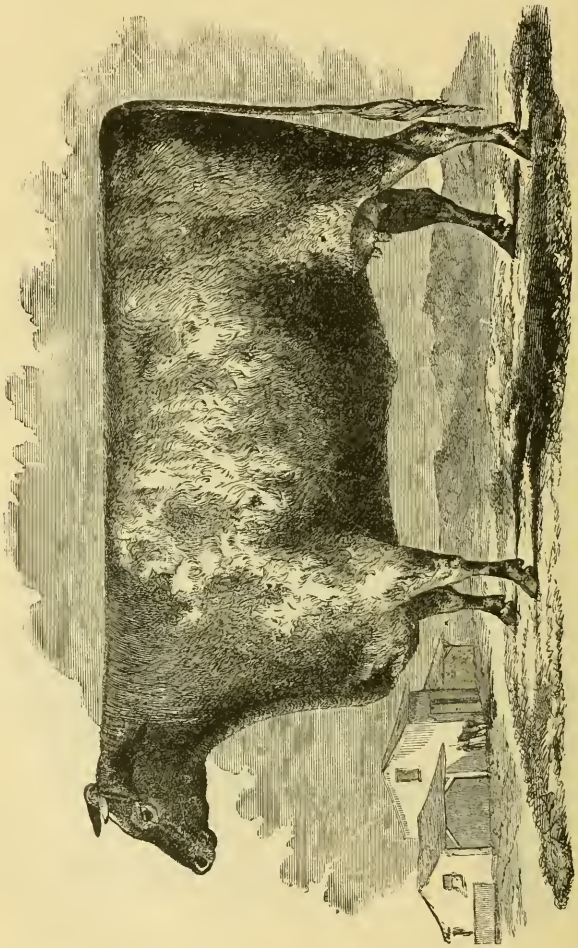
don, have been purchased by English breeders, and sent over to them at good prices, where they are highly valued.



YEARLING SHORT-HORN BULL.

In 1852–3–4, several spirited companies were formed in Clinton, Madison, and other counties in Ohio, and in Bourbon, Fayette, and some

other counties of Kentucky, and made importations of the best cattle to be found in the English herds, and after their arrival here, distributed



SHORT-HORN COW, "DIANA."

among their stockholders. Mr. R. A. Alexander, of Kentucky, also, during those years, made extensive importations of choice blood for his

own breeding, so that in the year 1856, it may be said that the United States possessed, according to their numbers, as valuable a selection of Short-Horns as could be found in England itself.

Keeping pace with the States, a number of enterprising Canadians, since the year 1835, among whom may be named the late Mr. Adam Fergusson, Mr. Howitt, Mr. Wade, the Millers, near Toronto, Mr. Frederick Wm. Stone, of Guelph, and Mr. David Christie, of Brantford, in Canada West, and Mr. M. H. Cochrane and others, in Lower Canada, have made sundry importations of excellent cattle, and bred them with skill and spirit. Many cattle from these importations, and their descendants, have been interchanged between the United States and Canada, and all may now be classed, without distinction, as American Short-Horns.

Short-Horns in the West.

In the Northwestern States the first importation of Short-Horns direct from England was by the Illinois Importing Company, in 1858. This was an association of gentlemen, a part of them members of the State Board of Agriculture, in connection with prominent breeders of the State. They returned in July of the same year with twenty Short-Horn cows and seven bulls, of approved blood, which were sold at auction on August 27th, at Springfield, to breeders throughout the State. They also brought over two stallions, three Cotswold rams, nine ewes, four Southdown rams, eight Southdown ewes, five Berkshire boars, four Berkshire sows, and ten boars and sows of Irish breeds; also Cumberland and Yorkshire boars and sows. From this time on, various States in the West have taken up the breeding of Short-Horns as they have increased in wealth and population, until now no finer herds can be found in any other locality; and, the fact that at the New York Mills sales individual animals brought prices all the way to over $30,000, for exportation to England — prices which before this time would have been considered fabulous — shows conclusively that Short-Horns, as bred in the United States, have not suffered in comparison with those bred in their native land. No such prices were ever reached before in any country in the world; nor have they been since. To-day they are found wherever civilization extends. As beef producers they have no superiors: as milk producers there are families eminent in this respect, and they have left their impress upon the stock of the country wherever introduced.

Short-Horns for the Dairy.

It has been held that the Short-Horns are as good for milking as they are for beef. That they once were most excellent dairy cows there is no

doubt. That American Short-Horns of the present are not, as a class, even decent milkers, there is as little doubt. The early importations of Short-Horns were of the milking strains. For the last thirty years, however, they have been bred with such special reference to beef points and early maturity that it is now difficult to find a decent milker in any of the more fashionable strains of blood, and very many of the cows will not give milk enough to properly raise a calf. Once in a while, however, a very superior milking animal appears, showing, by reversion, what the capabilities of the breed might be in this direction.

That the early importations of Short-Horns were uniformly good in this direction, as well as admirable beef cattle there is no doubt. That they have left their impress upon the native cattle in this direction is unquestioned. That they exist to some extent in England and America, in particular herds, is certain. We have seen them here and know they are there. They have grown less, year by year, as the improvement of other dairy breeds became more and more manifest, until of late years little has been claimed for them as milkers. Their great value as early maturity beef makers,—attaining great weight—having superceded their purely milking characteristics. Among the better milkers may be named the descendants of the "Patton breed," the "seventeens," or the importation of 1817, and some descendants of the Ohio importation of 1834. In fact, this latter importation was made solely with a view to beef and flesh points, and since this time milk has been ignored by the more fashionable breeders both in England and America.

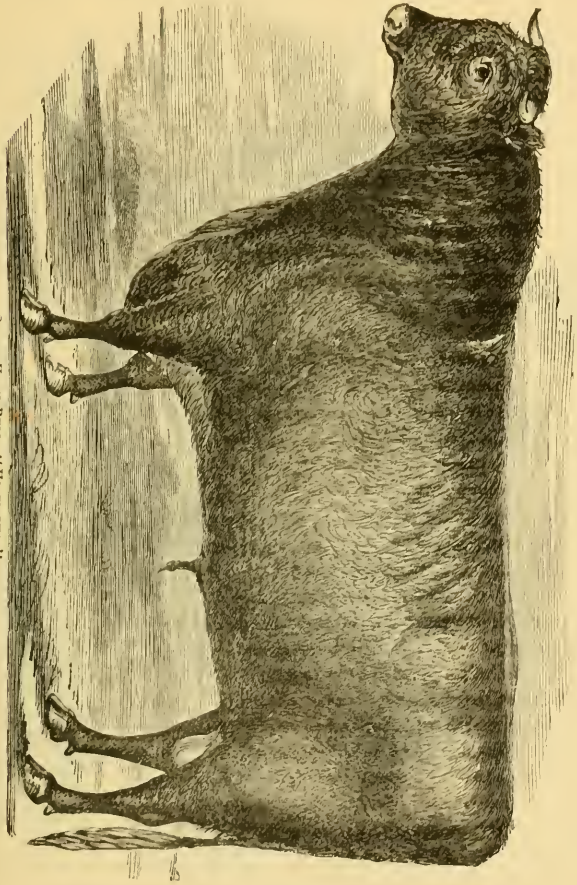
Short-Horns for Beef.

Throughout the whole West, especially, beef was the object sought. The land was cheap, fertile, and the pastures flush. Until within the last few years, butter and cheese was not an exportable product, beef was. It is not strange that a class of animals was sought that would produce the most beef in the least possible time. How this has been developed, the great herds of Ohio, Kentucky, Tennessee, Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa, and later, Minnesota, Nebraska, and Kansas, give ample proof.

In breeding there are no superior cattle in the world. Their usefulness as beef producers will continue to grow with the settlement of the country. The value of the bulls for crossing upon the ordinary stock of the country is becoming more and more appreciated every year. It will continue to be an increasing integer for many years to come.

On the next page, as showing a modern bred Short-Horn bull, combining excellent beef points, with great stamina and constitution, we give an illustration of "Hiawatha."

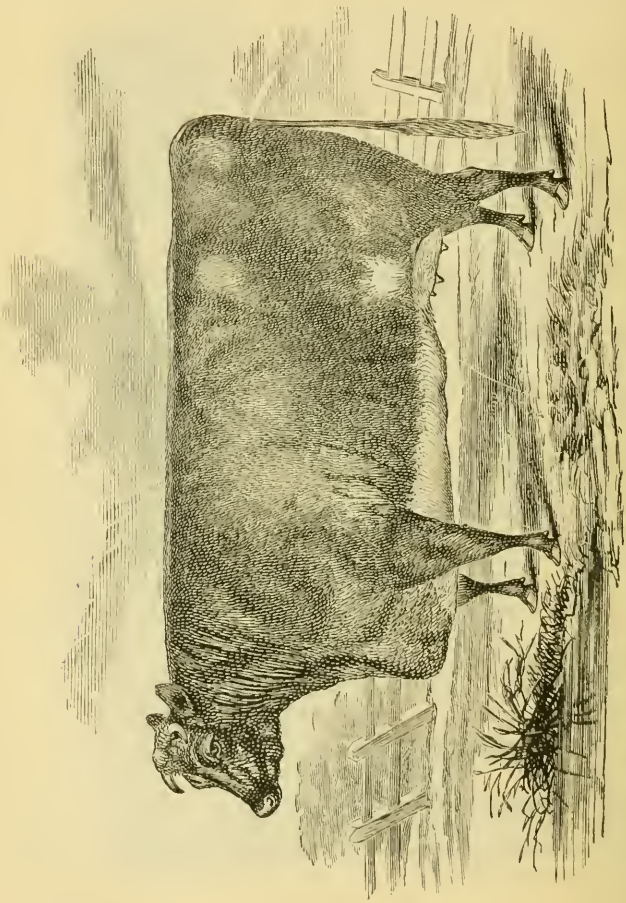
The modern Short-Horn has great thickness of carcass, squarish-rotund shape, rapid growth, early maturity, and a ripeness at two, three, four, or five years, that is attained by no other breed. Many are also the hand-



SHORT-HORN BULL, "HIAWATHA."

somest cattle to look at of any known breed—weight, substance and style being taken into consideration. There is a wonderful fullness in the carcass, extending to every part. The choice flesh is put on in parts

where ordinary cattle fail; the offal is exceptionally light, as light as it would be among common native cattle of two-thirds the weight. In the milk-yielding Short-Horns there is a tendency to leanness. Many are



SHORT-HORN COW, "ROSAMOND."

lighter before, flatter in the side, but yet exceedingly firm all over, from a dairyman's standpoint. In the beef animals there is a rotund fullness, a smoothness, a majesty, no where else seen.

As showing beef in the Short-Horn cow, in an eminent degree, we give a portrait of the cow "Rosamond," showing not only good beef points but milking qualities as well.

Points of Short-Horns Described.

The points of Short-Horns—and which will apply in judging all beef animals, with slight variations, to be hereafter described—are worthy of a somewhat minute description. The points are of two classes—those observed with the eye and those felt by the touch. By the eye one observes the general contour of the animal; size, length, breadth, thickness, fineness of body, head and limb; the loin, back, thigh, the spring of the rib and the manner in which the animal is ribbed up close to the hip bones. The touch—that is, the feeling under the touch—shows length and quality of the hair, thickness and elasticity of the skin. The eye and expression of countenance is indicative of disposition and temper. An elastic, mellow and yet firm hide, of medium thickness, is an indication of well marbled flesh, while a floating, soft skin will indicate blubbery fat, and often dark colored flesh.

The Butcher's Profit.

The butcher in buying an animal for beef has now-a-days but a single object in view—the animal that will turn out the greatest amount of lean meat in the prime parts, with the least offal, and only a moderate amount of fat; for fat is now one of the cheapest portions of the animal. Years ago, in the days of tallow candles, the reverse was the case. The back, loin, and ribs are the choice bits; next the rump and thigh; then the shoulders; while the neck and head are comparatively worthless. The sagacious breeder, while keeping this constantly in view, seeks to add early maturity to good flesh. He who comes nearest to this has the best animal, whatever the breed, or the pedigree of the particular breed. The butcher's block is the final, the crucial test.

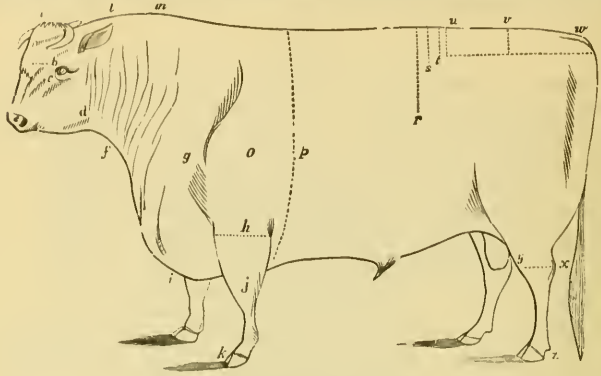
A description of the points of the Short-Horn was so carefully and admirably given by Dr. A. C. Stevenson, President of the Indiana Short-Horn Breeders' Association, at the first convention thereof, that we append a synopsis, accompanied with an outline of a Short-Horn, to which reference can be made, illustrating the principal points.

In this it will be seen that a, b, c, d, f, h, m, j, k, x, y, z, represent the inferior parts; from the girth p, back, including r, s, t, u, v, the superior parts. From this it will be easy to understand the points and the respective numbers as given in the scale.

The Head.

"The head should be small." This is a very imperfect description of

the head, but in too many accounts, all that is given. If the size of the head were all that was of consequence, a pound difference in any case



POINTS OF SHORT-HORN BULL.

would be of little consequence in the sale of a bullock. It is the *form* of the head that becomes of so much interest to the breeder. The head above the eyes should be wide, giving space for large cerebral development. The intelligence of the animal depends upon a well-developed brain and nervous system; upon which, also, so much depend the vigorous and healthy action of the organs of digestion and assimilation; the circulation and the vital functions generally; the intelligence and temper of a cow depends much upon a well-developed brain. It will be found by observation that most vicious beasts have small upper heads, and are large below the eyes. Again, the upper head should be wide, to give width to the articulations of the lower jaw. It is necessary that the part of the mouth where the food is to be masticated should be large, that the supplies required for the stomach may be well masticated and re-masticated in chewing the cud. There is another reason for width at the base of the head and between the angles of the lower jaw; it is here that the very important passages have their entrance, which supply food for the stomach and air for the lungs. Close at hand, also, is the important connection of the spinal marrow and the brain, to say nothing of many large and important blood-vessels that find their way to the head. These considerations we think conclusive as to the necessity of size of head in the cerebral portion.

The portion below the eyes, the face, should be comparatively small. Its principal office is to gather food and air. Thin lips and elastic nostrils are wanted. The eyes should be large, bright and lively, and yet quiet. The physiognomy of the ox is as clearly indicative of his character

as that of a man is written upon his face; and the reason that less is indicated in the face of an ox is because he has fewer vices, and has been guilty of fewer transgressions. A small dark eye, set in a dark circle, with a large face below and a narrow head above, will indicate an animal that is bad tempered, wild, and consequently a poor feeder. The circle around the eye should be of a bright yellow color, the nose the same. These considerations may seem trifles, yet this color is the result of a peculiar secretion, and the inference is a probable one, at least, that other secretions will be apt to resemble it in color. Hence, the secretion of milk will be apt to resemble it in color, and a bright colored flesh is betokened by these peculiar secretions as indicated in the color of the nose and circles about the eyes. As a very large ear mostly indicates sluggishness, one of medium size is preferable. A bullock of fine organization will manifest very clearly his impressions by the movement of his ears. If he flees from danger his ears are erect, or a little inclined backward, that he may be the better warned of danger behind. If he is in haste to meet a kind master, who is bringing him a desired meal, the ear is presented forward. The horns should be clear, without black tips or any black marks whatever—some say of a waxy color, some again, claim that they should be flat in Short-Horns. But these matters are, most of them, non-essentials. We dismiss the head, after attaching it to the neck in its proper position—not at right angles, but at an angle of so many degrees that, with the under part of the neck it forms an arch. This gives a better throat and a freer passage for the food and air to the stomach and lungs, and is graceful withal.

The Neck.

The neck expresses very much less to the breeder than the head and face. The neck should be just long enough to enable the taking of food easily from the ground. It should be strong and well muscled upon its sides, covering at its base the points of the shoulders well, and at its junction with the head it should be small and round, with its skin fitting it pretty much as a well-fitting stocking does the leg—the under line of the neck with the under line of the jaw. A thin, broad neck is sure to indicate weakness and poor feeding and fattening qualities. Animals having such may well be avoided as breeders.

Contour of the Body.

The butcher, the breeder and the stock dealer, may now meet and consult profitably on the general contour of the body. Here the opinions of the former may be adopted, as he fixes the price of all 'butchers' stuff.' The ox of given weight that will sell for most in mar-

ket possesses the points that must be adopted. These points are now, however, well established, and we have only to refer to them and notice the reasons on which they are founded. We proceed to name them before we give their *rationale*. In general contour the body should be nearly a square. The crops should be wide. The line of the back should be straight; the line of the belly nearly so, swelling a little behind the ribs; the flank low; the ribs barrel-shaped; the loins wide, and the rump long and wide; the back should be wide, and the thigh should be long and wide; the legs short and comparatively small, or at least not coarse; tail light; hair soft and fine. The color should be red or white, or a mixture of the two, as roan or pied.

As has already been said, the body should be nearly a square. The vital currents moving in short lines are more effective than when moving in those of great length. The blood moving from the heart along very extended channels, flows with much less force as it recedes from the cause that set it in motion. The same is probably true of the nervous currents. The great vitalizing organs are located near the center of the system—a provision of nature by which the vital currents are shorter than under any other arrangement. Here is the heart sending out its great currents of arterialized blood in all directions, to supply and nourish all the members of the body. Sitting over it is that wonderful air machine, the lungs, receiving the entire venous currents—an atmospheric bath—by which they are so renovated and changed as to make the blood again fit for the heart's use, to which it is returned by the shortest possible route. These organs lie encased together, and never cease their operations night or day. But just here in this great center is another great vitalizer of fully equal importance—the stomach. Here the food is received and changed into chyle, which is at once thrown into the circulation, where its office of supplying the system is performed. Now, the nearer a body is compacted around these great vitalizing systems the more effectual will be the supplies. Observation fully sustains these views. A very lengthy bullock never fattens so readily as a short one. The breeds of hogs with long bodies are known not to fatten so readily as those of short, square forms, as the Siamese and Chinese. The same is true of sheep, and also of the horse. And even in man, we rarely find a corpulent man who will measure six feet. Obesity will generally be found under six feet. Health and vigor is equally confirmed by observation, as a result of the square structure. Longevity may also be claimed with the greatest propriety for the same proportions. A bullock with a square frame will be sure to possess all the qualities of health and vigor, and will feed and fatten as well or better than a long one.

Broad in the Crops.

The animal broad in the crops has a better back; but it is also evidence of a better rib beneath the shoulder-blade, giving greater width to the chest within, and consequently greater play to the lungs. This position of the shoulder-blade enables the legs to be brought more gracefully under the chest beneath. There are some beasts whose fore-legs stand so wide apart that they very much resemble two sticks stuck into a large pumpkin. Such animals are considered awkward and inconvenient at least.

The Back Should be Straight and Broad.

A broad back affords valuable roasting bits, and will be the delight of the butcher. The straight back affords a better spinal column, and gives the proper space to the cavities beneath, which, as we have just seen, are occupied by the most important organs. A straight line also gives to the ribs a more graceful as well as more convenient attachment.

Ribs Should be Barrel-Shaped.

The ribs rising well from the spine, giving to the body a round or barreled shape, gives much more room to the organs within—the heart and lungs—than there would be if the ribs descended in such a manner as to give a flat side. A beast with flat sides, and consequently a narrow throat, will lack greatly in vigor and health, and all the essential qualities that constitute a good bullock. A bad rib gives poor space to the abdominal organs which lie immediately behind those of the chest, unless the belly is greatly sagged, which is generally the case, as nature frequently, to relieve one deformity adds another.

The Loin Should be Wide.

This is an interesting point to those who love choice bits and are willing to pay well for them. The butcher makes large estimates here, and is sure to suit liberal purchasers. But nature is ever true to herself, for here, as elsewhere, beneath a broad loin she has provided large space for important organs, as the bowels, kidneys, and the organs of the pelvis. The rump of a good Short-Horn is a very nice point. The back should extend out straight to the setting on of the tail. The thigh should pass up to this point nearly straight, so as to make the junction a right angle. This point, in many beasts, will be found to be a circle, which is unsightly and causes a loss of prime beef.

The Legs.

The legs should be short. There are precisely the same reasons for

objecting to long legs that there are to long necks or long bodies. Observation proves a *leggy* animal to be not so good a feeder as one with short limbs. The bone of the leg should be fine and smooth, and not too large. The legs should stand well under the animal, and the hocks directly in line with the body, so that in moving, the hocks will be well separated, or about as far apart as the hind feet. The fore-legs should be straight and stand well under the chest, that the animal may have an easy and free movement. The inner side of the fore-legs, as it passes the sternum, presents a beveled appearance, to bring the limbs to their proper position beneath. Upon the proper position of the limbs depends that ease and gracefulness with which a bullock should move. It may be thought of no consequence how a bullock moved so that he is able to get to the market, but be assured there is much in it, it evinces strength and health, which are indispensable in feeding. I have seen Short-Horns carrying two thousand pounds and upwards, with limbs so perfect that their movements were as nimble as if they were carrying but a thousand.

The Touch.

By this the butchers ascertain beforehand the quality of the flesh. By it the breeder ascertains the aptitude to fatten as well as the quality and quantity of flesh that the animal will carry.

Of all the qualities of the ox, this is probably the most difficult to understand. It is the peculiar sensation of softness and elasticity that is produced by the pressure of the hand on different parts of the body. This sensation depends, in part, upon a large cellular development beneath the skin and between the muscles, and part upon the muscular structure, adapting itself to the laborious duties it has to perform. It is, therefore, to the cellular and muscular tissue that this sensation of touch is to be attributed. It is very common to find a softening of the muscular fibre as an accompaniment or a precursor of disease that may mislead. The same may be observed in the aged of both man and beast. What is 'touch,' or what is it to 'handle well?' How is it to be distinguished from that which portends bad health and old age? By its elasticity—its power to replace the parts when pressed—a springy sensation. Mellowness from disease has a sluggish feel and moves slowly when under the hand; to a less extent, it is true, still something of the same that is manifested in the pressure of the fingers on a dropsical limb as compared with a healthy one. In the one the indentions replace themselves sluggishly, whilst in the other with a ready elasticity.

It will require much practice to become an adept in this knowledge. Still many useful lessons may be daily had by the examination and handling of one's own stock. Comparative handling will afford much

assistance. Take those animals that are known to accumulate fat readily and largely, as the opossum or the bear, or any other known to take on fat readily, and you will find a peculiarly soft and mellow 'touch.' Those breeds of swine, as the Chinese or Siamese, that are known to accumulate fat largely, as compared with some of the poorer wood breeds, will offer good and ready illustrations. But probably the most ready illustration will be found in man himself. All that class of persons disposed to corpulency will be found to have a soft mellow touch, while those disposed to leanness will be found rigid and hard. This may be readily recognized in shaking hands. A very delicate lady may sometimes be found to have a hard hand as well as a sharp tongue. Smooth, soft skin will also be found belonging to this class of persons.

The Skin.

The skin should be thick, soft and elastic—fitting alike either a poor or fat ox. A lean animal, with an inelastic skin stretched upon him, could not fatten for the want of space to expand in. But with an elastic skin he may be swelled to great dimensions in what seemed to be but a covering for his bones. The skin performs very important functions in the animal economy. It is not only a covering for all the parts beneath it—a protector against cold and heat, and all external causes of danger, but it is the seat of a vast system of minute blood vessels and capillaries, of exhalents and absorbents. A vast nervous tissue centers here that renders the skin sensitive in the highest degree. The great vital worth and importance of the skin may be readily appreciated by any injuries done it. The rapidity with which extensive burns destroy life, may serve as a sufficient illustration. 'Destroy my skin, and you shall have my bones also.'

The Hair.

The hair should be thick and fine, forming a protection against inclemencies of weather. It is not sensitive, and is, therefore, a proper shield to the whole body, and it is an evidence of the wisdom displayed in the creation of this family of the animal kingdom, that its hair—its outer garment, against which all injuries must first come—should be without sensation—a complete coat of mail, injuries to which cause no pain. Fine hair is also an evidence of a finely organized skin, a skin exquisitely finished in its whole structure of minute vessels and tissues. A skin thus delicately organized is also evidence that other organs are alike constructed. Nature, in all her parts, undoubtedly produces a correspondence, so that if one part is of a peculiar structure, either fine or coarse, other parts are apt to correspond. Parts seen may be considered indica-

tive of parts not seen. It may be permitted to add that in all the scrub cattle that I have grazed and fed, I have never found one with fine silky hair that did not fatten well and make a desirable bullock.

Color.

Short-Horns are red or white, or these colors blended as roan or pied. Fashion, for the time, may make one or the other of these colors popular. This is probably so now with the red color. It may be so of another color in a few years. A caprice that excludes all but the red color is injurious. It limits improvement and confines it to a limited portion of the breed. It encourages the use of inferior animals just to obtain a fashionable color, and rejects better ones because they are of different color. There is, in consequence, great danger of deterioration of this noble breed of cattle as a result of such puerile practices. If the breed is to be kept up to its past high standard the very best selections should be bred regardless of color, provided it is the one peculiar to the breed. We would admonish breeders and lovers of this noble race of cattle to give no encouragement to such departures; they are evil, and that continually.

Perfection.

Both ignorant and cultivated alike; the ordinary breeder and the scientific one; the practical man and the visionary one; each will establish in his own mind an ideal of what any object should be. When this ideal is required to stand the test of practical experience, to be defined by a scale of points, not one in ten, even among those who think themselves competent to establish a standard of excellence can do so, point by point. The reason is he has never read, nor has he educated himself in any other way to that exactitude of judgment required in matters of such nicety; in other words we have not the scientific idea of what is necessary in the premises; no absolute rule to go by, and so the whole amounts, after all, to something very like mere guessing. For dairy purposes the udder of the cow is the strong point. In animals bred for their flesh, the meat is the essential thing and also that it be laid on in the prime parts.

To enable any person to judge more or less correctly according to the study he gives, and the manner in which he has educated his eye and touch, we append the scale of points for judging Short-Horns, as found in the American Herd-Book.

In studying this scale it will do quite well for all beef breeders—always bearing in mind the difference in make up of the breed. Thus the Short-Horns will be found full in the rump behind, the Devons and Herefords more pointed, and essentially different in other respects; yet these very

differences constitute their value; their beef is certainly better than that of the Short-Horn; but still they fail in other particulars. There is no such thing as absolute perfection in any thing finite. We simply come as near it as possible. The Short-Horns, in all their attributes, certainly have but little more to be desired as beef makers, and some families, alas too few, are deep and excellent milkers.

Scale of Points for Short-Horn Bulls.

	Points.
Art. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten; sire a good stock-getter, dam a good breeder; and giving a large quantity of milk, or such as is superior for making butter or cheese. - - - - - - - - -	7
Art. 2.—Head muscular and fine; the horns fine and gradually diminishing to a point, of a flat rather than a round shape at the base, short and inclined to turn up, those of a clear, waxy color to be preferred, but such as are of a transparent white, and tinged with yellow, admissible; ears small, thin and covered with soft hair, playing quick, moving freely; forehead short, broad, especially between the eyes, and slightly dished; eyes bright, placid, and rather prominent than otherwise, with a yellow rim around them; lower part of the face clean, dished and well developing the course of the veins; muzzle small, nose of a clear orange or light chocolate color; nostrils wide and open; lower jaw thin; teeth clean and sound. - - -	5
Art. 3.—Neck fine and slightly arched, strongly and well set on the head and shoulders, harmoniously widening, deepening and rounding as it approaches the latter point; no dewlap. - -	2
Art. 4.—Chest broad, deep and projecting, the brisket on a lower line than the belly. - - - - - - - - - -	5
Art. 5.—Shoulders broad, strong, fine and well placed; fore-legs short, straight, and standing rather wide apart than narrow; fore-arm muscular, broad and powerful, slightly swelling and full above the knee; the bone fine and flat; knees well knit and strong; foot flat, and in shape an oblong semi-circle; horn of the hoof sound and of a clear waxy color. - - - - -	2
Art. 6.—Barrel round and deep, and well ribbed up the hips. -	4
Art. 7.—Back short, straight and broad from the withers to the setting on of the tail; crops round and full; loins broad; huckle bones on a level with the back; tail well set, on a level with the back, fine and gradually diminishing to a point, and hanging without the brush an inch or so below the hock, at right angles with the back. - - - - - - - - - -	4

ART. 8.—Hind quarters from the huckle to the point of the rump well filled up; twist well let down and full; hind legs short, straight, and well spread apart, gradually swelling and rounding above the hock; the bone fine and flat below; legs not to cross each other in walking, nor to straddle behind. - - - 3

ART. 9.—Skin of medium thickness, movable and mellow; a white color is admissible, but rich cream or orange much preferable; hair well covering the hide, soft and fine, and if undercoated with soft, thick fur in winter, so much the better; color, pure white, red roan, bright red, or reddish yellow and white. (A black or dark brown nose or a rim around the eye, black or dark spots on the skin and hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - - 3

ART. 10.—Good handling. - - - - - - - - - 4

ART. 11.—Sure stock-getter. - - - - - - - - 4

ART. 12.—Stock, when made steer, certain to feed kindly for beefers at any age, and make prime beef. - - - - - - 5

ART. 13.—General appearance. - - - - - - - 2

Perfection. - - - - - - - - - - - 50

Scale of Points for Short-Horn Cows.

POINTS.

ART. 1.—Purity of breed on male and female side: sire and dam reputed for docility of disposition, early maturity and aptitude to fatten. Sire a good stock—getter. Dam a good breeder; giving a large quantity of milk, or such superior for making butter or cheese. - - - - - - - - - - 7

ART. 2.—Head small and tapering; long and narrower in proportion than that of the bull. Horns fine and gradually diminishing to a point; of a flat rather than of a round shape at the base; short, and inclined to turn up; those of a clear waxy color to be preferred; but such as are of a transparent white, slightly tinged with yellow, admissible. Ears small, thin, and well covered with soft hair; playing quick, moving freely. Forehead of good breadth between the eyes, and slightly dished. Eyes bright, placid, and rather prominent than otherwise, with a yellow rim round them. The lower part of the face clean, dished, and well developing the course of the veins. Muzzle small; nose of a clear bronze, or light chocolate color—the former much preferred. Nostrils wide and well opened. Lower jaw thin. Teeth clear and sound. - - - - - 5

ART. 3.—Neck fine and thin, straight, and well set on to the head and shoulders, harmoniously widening, deepening, and slightly rounding in a delicate feminine manner as it approaches the latter point. No dewlap. - - - - - - - - - 2

ART. 4.—Shoulders fine and well placed. Fore-legs short, straight and well spread apart. Fore-arm wide, muscular, slightly swelling, and full above the knee; the bone fine and flat below. Knees well knit and strong. Foot flat and in the shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. - - - - - - - - - - - - 2

ART. 5.—Chest broad, deep and projecting—the brisket on a lower line than the belly. - - - - - - - - - - 5

ART. 6.—Barrel round, deep and well ribbed up to the hips. - 5

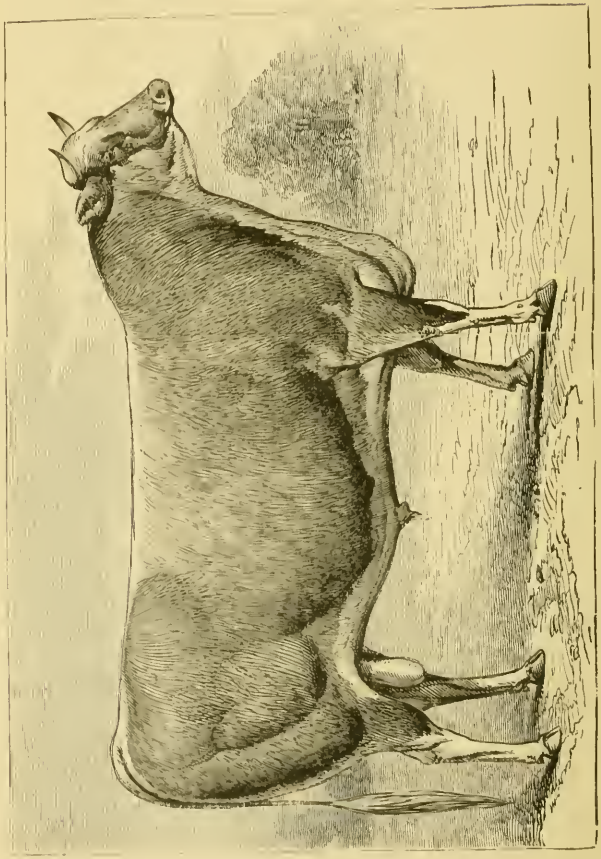
ART. 7.—Back short, strong, straight from the withers to the setting of the tail. Crop round and full. Loin broad. Huckle bones on a level with the back. Tail well set, on a level with the back or very slightly below it: fine and gradually diminishing to a point; and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - 4

ART. 8.—Hind quarters from the huckles to the point of the rump long and well filled up. Twist well let down and full. Hind legs short, straight and well spread apart; gradually swelling and rounding above the hock; the bone fine and flat below. Foot flat, and in shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. Legs not to cross each other in walking, nor to straddle behind. - - - - - 3

ART. 9.—Udder broad, full, extending well forward along the belly, and well up behind. Teats of a good size for the hand; squarely placed with a slight oblique pointing out; wide apart; when pressed by the hand the milk flowing from them freely. Extra teats indicative of good milking qualities, but should never be milked, as they draw the bag out of shape. Milk veins large and swelling. - - - - - - - - - - 4

ART. 10.—Skin of a medium thickness: movable and mellow; a white color is admissible, but a rich cream or orange much preferable. Hair well covering the hide; soft and fine, and if undercoated with soft, thick fur in the Winter, so much the better. Color pure white, red, roan, bright red, red and white, spotted roan, or reddish and yellow and white. (A black or dark brown nose, or rim around the eye, black or dark brown spots on the skin and the hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - - 3

Art. 11.—Good handler.	4
Art. 12.—Sure and good breeder.	4
Art. 13.—General appearance.	2
Perfection.	50



Jersey Bull, "Comet."

V. The Alderneys.

In the British Channel, between Great Britain and France, are a number of islands noted for their salubrity of climate and fertility of soil. Many years ago these islands, particularly Jersey, were noted for their

superior fruit, and large quantities of cider and perry were annually made there.

Of late years these islands, Alderney, Jersey, and Guernsey, have become celebrated throughout England and America, for their breed of cattle; the cows of which give milk of unsurpassed richness.

These cattle are undoubtedly of French origin. The Normandy cattle are larger than the Jerseys, and Youatt says, have a greater tendency to fatten. He passes them by, in his admirable work on cattle, with scarcely more than a mention; this is to be regretted, since he was so careful and conscientious a historian. He says:

"They are found mainly in gentlemen's parks and pleasure grounds, and they maintain their occupancy there, partly on account of the richness of their milk, and the great quantity of butter which it yields, but more from the diminutive size of the animals. Their real ugliness is passed over on these accounts; and it is thought fashionable that the view from the breakfast or drawing room of the house should present an Alderney cow or two grazing at a little distance.

"They are light red, yellow, fawn or dun colored; short, wild-horned, deer-necked, thin, and small-boned; irregularly and often very awkwardly shaped."

A Prejudiced Statement.

Quoting from Mr. Parkinson, who, Mr. Youatt says, seems to have had a determined prejudice against them, he writes:

"Their size is small, and they are of as bad a form as can possibly be described; the bellies of many of them being four-fifths of their weight. The neck is very thin and hollow; the shoulder stands up, and is the highest part; they are hollow and narrow behind the shoulders; the chine is nearly without flesh; the hucks are narrow and sharp at the ends; the rump is short, and they are narrow and light in the brisket." Mr. Youatt adds for himself:

"This is about as bad a form as can possibly be described, and the picture is very little exaggerated, when the animal is analyzed, point by point; yet all these defects are so put together, as to make a not unpleasing whole."

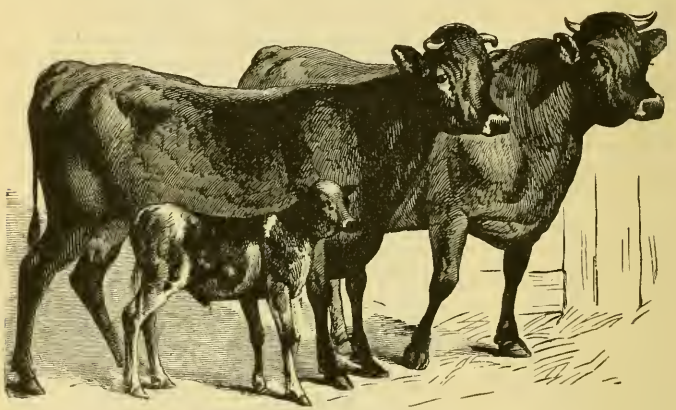
Mr. Youatt, however, compliments them with giving exceedingly rich milk, and with fattening in a surprising manner when dry.

We have quoted the above for two reasons: one as showing probably what may have been nearer the truth than we might naturally expect from seeing the best specimens now, and the other as showing that this breed has made a great advancement since his day, both in quantity of milk given, and in symmetry and perfection of form.

From an American Standpoint.

Mr. Lewis F. Allen, the best known historian of American cattle, says of this elegant and deer-like race:

"Beginning with the head — the most characteristic feature — the muzzle is fine, the nose either dark brown or black, and occasionally a yellowish shade, with a peculiar mealy, light-colored hair running up the face into a smoky hue, when it gradually takes the color of the body; the face is slightly dishing, clean of flesh, mild and gentle in expression, the eye clear and full, and encircled with a distinct ring of the color of the nose; the forehead is bold, horns short, curving inward, and waxy in color, with black tips; the ear is sizable, thin, and quick in movement. The whole head is original, and blood-like in appearance, more so than in



A Trio of Jerseys.

almost any other of the cattle race—reminding one strongly of the head of our American Elk. The neck is somewhat depressed — would be called 'ewe-necked,' by some — but clean in the throat with moderate, or little dewlap; the shoulders are wide and somewhat ragged, with prominent points, running down to a delicate arm and slender legs beneath; the fore-quarters stand rather close together, with a thinnish, yet well developed brisket between; the ribs are flat, yet giving sufficient play for good lungs; the back depressed, and somewhat hollow, the belly deep and large, the hips tolerably wide, the rump and tail high, the loin and quarter medium in length, the thigh thin and deep, the twist wide, to accommodate a good sized udder, the flanks medium, the hocks or gambrel joints crooked, the hind legs small, the udder capacious, square,

set well forward, and covered with soft, silky hair; the teats fine, standing well apart, and nicely tapering; the milk veins prominent."

Characteristic Colors.

The colors are mostly light red or fawn, and black, mixed and plashed with white; the solid colors are, we think, generally favored, and, to our mind, the best cattle, as showing careful breeding, though we have seen the most superior cattle among all these colors. So we have seen some distinctly roan, with round, quite smooth forms, called pure; they should always be avoided, as there is more than a suspicion that such have Short-Horn blood in them, which can do this breed no good, but on the contrary, harm.

The breed is distinctly a milk breed, and is of no value whatever except as yielding fair messes of exceedingly rich milk—giving largely of the most superior cream, producing hard, and most delicately flavored butter. Thus any cross on this ancient and carefully bred stock must necessarily injure them in the points where they excel other cows. These are: Superiority of the milk, cream and butter, golden in color, delicate in texture and flavor, and commanding prices in the market, from wealthy citizens, that no other make can reach.

They are Milking Cows.

Whichever of the three varieties may be chosen, they should be bred for this and nothing else. Whether they be from Alderney, Jersey, or Guernsey, no infusion of other blood can improve them, neither can they improve any other breed. The bulls may improve our native cows, if the cows be good milkers, the hereditary milking qualities of the race being pre-potent in the progeny. For this improvement, however, none but pure blood bulls should be used, and this rule will hold good in all breeding.

The pure animal is pre-potent, the grade is not, and pure bred animals of all the superior races are now so plenty that it will not pay to use grade bulls for the improvement of stock.

The Value of Purity.

To show the value of purity, we will perhaps, find no more appropriate place than this.

A thorough-bred animal upon native stock produces in the first succeeding generation an animal partaking equally of the blood of the sire and dam, or what is called a half-blood. The next generation, or the produce of a full-blood and a half-blood will give a three-quarters-bred animal.

The young of a pure-bred and three-quarters-bred will give a seven-eighths-bred. Following in the same line the next generation will give an animal possessing fifteen-sixteenths of pure blood.

In reality it will be far more than we have stated, for the pre-potent element of pure blood, constantly present, will continually be an increasing integer in the progeny. Hence animals from seven-eighths to fifteen-sixteenths-bred, cannot be distinguished from one purely bred, except by a most critical, and at the same time expert judge. For all practical purposes they are fully equal to an animal purely bred, that is to say, as dairy cows, but here the comparison must end. A taint of impure blood once in, cannot be bred out for many generations—never in fact. There is always danger of reversion. One may, theoretically at least, breed grades up for a thousand years, and yet not have purely bred animals. Hence the extraordinary prices paid for stock, the pedigrees of which have been kept absolutely without taint of admixture.

The Value of Points.

So important is the question of symmetry of form, and points of excellence, in stock, viewed as integers in the make-up of an animal—real value being adaptation to the necessities required—that, of late years, all animals are judged thereby. As a study of these we give a figured portrait of a model cow, illustrating perfection.

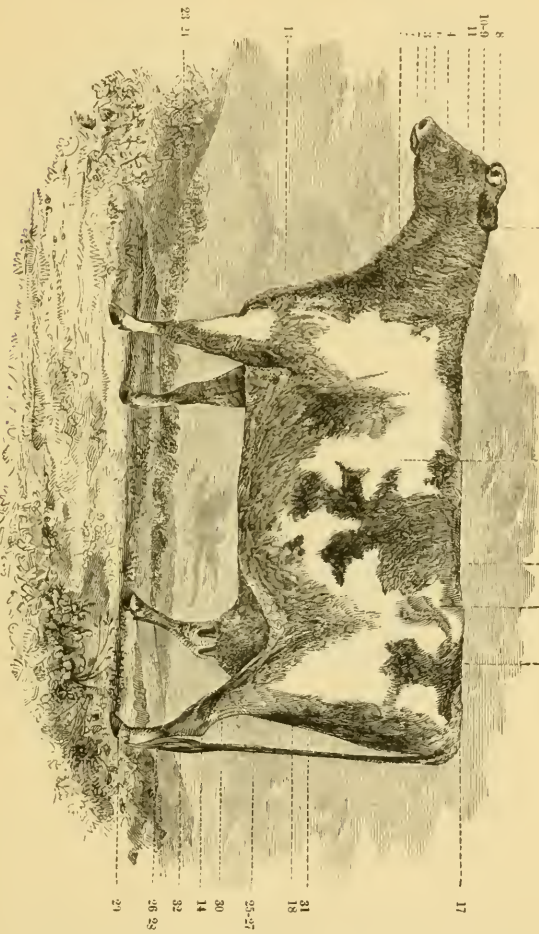
These points may be adopted in judging any cow, so far as general characteristics are concerned, deviations being only in matters of form, color, peculiar markings, shape of horns, and general contour. The Guernseys, for instance, are larger, somewhat coarser, and have of late years been placed in a family by themselves.

The scale of points given are those adopted by the Royal Jersey Agricultural and Horticultural Society, in determining the merits of animals to be passed upon:

Scale of Points—Cows and Heifers.

		Points.
1.	Head,—small, fine and tapering	1
2.	Cheek,—small	1
3.	Throat,—clean	1
4.	Muzzle,—fine, and encircled by a bright color	1
5.	Nostrils,—high and open	1
6.	Horns,—smooth, crumpled, not too thick at the base, and tapering	1
7.	Ears,—small and thin	1
8.	Ears,—of a deep orange color within	1
9.	Eye,—full and placid	1
10.	Neck,—straight, fine, and placed lightly on the shoulders	1
11.	Chest,—broad and deep	1

		Points.
12.	Barrel,—hooped, broad and deep	1
13.	Well ribbed home, having but little space between the last rib and the hip.	1
14.	Back,—straight from the withers to the top of the hip	1



Model Cow. Perfection 36 Points, Illustrated.

15.	Back,—straight from the top of the hip to the setting on of the tail, and the tail at right angles with the back	1
16.	Tail,—fine	1

		Points.
17.	Tail,—hanging down to the hocks	1
18.	Hide,—thin and movable, but not too loose	1
19.	Hide,—covered with fine, soft hair	1
20.	Hide,—of good color	1
21.	Fore-legs,—short, straight and fine	1
22.	Fore-arm,—swelling, and full above the knee	1
23.	Hind-quarters,—from the hock to the point of the rump well filled up.	1
24.	Hind-legs,—short and straight (below the hocks) and bones rather fine.	1
25.	Hind-legs, squarely placed, not too close together when viewed from behind	1
26.	Hind-legs,—not to cross in walking	1
27.	Hoofs,—small	1
28.	Udder,—full in form, *i. e.*, well in line with the belly	1
29.	Udder,—well up behind	1
30.	Teats,—large, squarely placed; behind wide apart	1
31.	Milk-veins,—very prominent	1
32.	Growth	1
33.	General appearance	1
34.	Condition	1
	Perfection	34

No prize shall be awarded to cows having less than twenty-nine points.

No prize shall be awarded to heifers having less than twenty-six points.

Cows having obtained twenty-seven points, and heifers twenty-four points, shall be allowed to be branded, but cannot take a prize.

These points, namely, Nos. 28, 29, and 31—shall be deducted from the number required for perfection in heifers, as their udder and milk-veins cannot be fully developed: *a heifer will, therefore, be considered perfect at thirty-one points.*

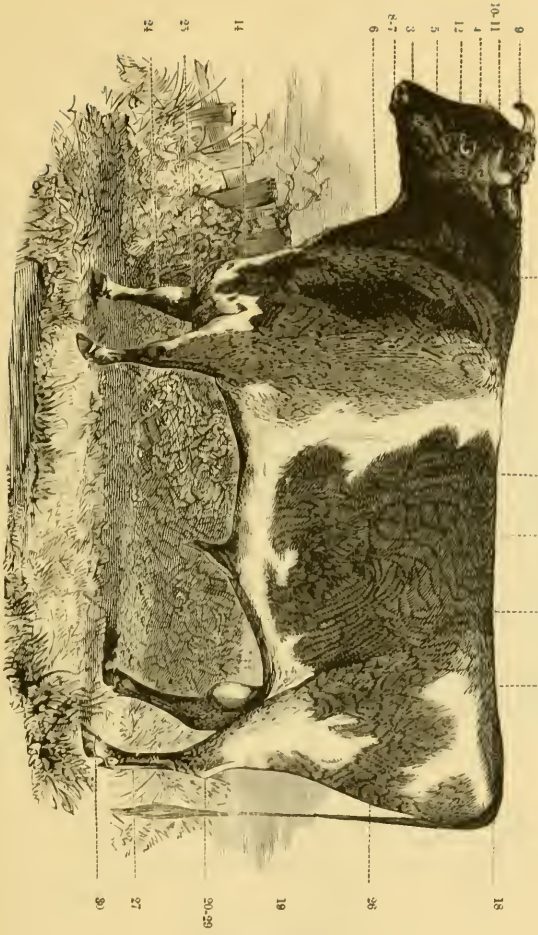
To this we add:

One point must be added for pedigree on male side.

One point must be added for pedigree on female side.

Again, the size of the escutcheon, or milk-mirrors, is a point of especial attention. This, however, will be treated in another chapter, for the escutcheon is now coming to be accepted as an indication of the milking qualities of a cow, and whatever the breed may be, strongly relied upon. And those who discard it, that is, refuse a cow with a strong escutcheon, will surely go astray.

In judging bulls, many of the same points will serve. The head will not be so small, and the forehead must be broad; the horns must be tipped with black; the neck, arched, powerful, but not too coarse and heavy; hide thicker than in the cow — certainly not thin — and mellow; fore legs short and straight, fore arm large and powerful, full above the knee and firm below it. As in cows, pedigree must have two points, one for purity of blood on the male side, and one for purity of blood on the female side.



JERSEY BULL. PERFECTION 33 POINTS. ILLUSTRATED.

The portrait of a bull given above illustrates the "points" adopted by the Royal Jersey Agricultural Society, and continued after an experience of ten years without alteration. Through it the reader will easily become conversant with the points by which Jersey bulls are judged. By refer-

ence to the figures given below, and corresponding in the illustration with the points the reader will understand the following

Scale of Points for Bulls.

Article.		Points.
1.	Pedigree on male side	1
2.	Pedigree on female side	1
3.	Head,—fine and tapering	1
4.	Forehead,—broad	1
5.	Cheek,—small	1
6.	Throat,—clean	1
7.	Muzzle,—fine and encircled with light color	1
8.	Nostrils,—high and open	1
9.	Horns,—smooth, crumpled, not thick at the base and tapering, tipped with black	1
10.	Ears,—small and thin	1
11.	Ears,—of a deep orange color within	1
12.	Eyes,—full and lively	1
13.	Neck,—arched, powerful, but not coarse or heavy	1
14.	Chest,—broad and deep	1
15.	Barrel,—hooped, broad and deep	1
16.	Well ribbed home, having but little space between the last rib and the hip.	1
17.	Back,—straight from the withers to the top of the hip	1
18.	Back,—straight from the top of the hips to the setting on of the tail, and the tail at right angles with the back	1
19.	Tail,—fine	1
20.	Tail,—hanging down to the hocks	1
21.	Hide,—thin and movable	1
22.	Hide,—covered with fine and soft hair	1
23.	Hide,—of a good color	1
24.	Fore-legs,—short, straight and fine	1
25.	Fore-arm,—large and powerful, swelling and full above the knee and fine below it	1
26.	Hind-quarters,—from the hock to the point of the rump long and well filled up	1
27.	Hind-legs,—short and straight (below the hocks) and the bones rather fine	1
28.	Hind-legs,—squarely placed, not too close together when viewed from behind	1
29.	Hind-legs,—not to cross in walking	1
30.	Hoofs,—small	1
31.	Growth	1
32.	General appearance	1
33.	Condition	1
	Perfection	33

Judging by Points.

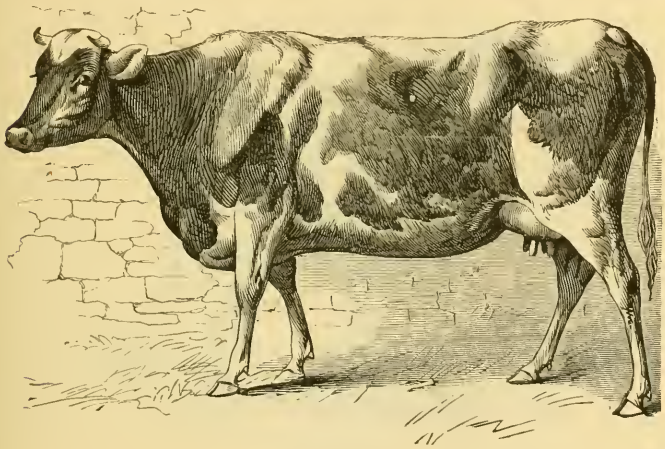
The highest excellence of any milking cow lies in the udder. This must not only be full in form, that is, in line with the belly, but it must not be cut off square in front, like that of a goat. It should be rounded, full,

presenting great breadth behind, and carried well up between the thigh. The milk veins should be full and carried well forward toward the fore legs. If knotted and with curves, so much the better.

The tail is another essential point. Whatever its size at the root, it *must* be large and tapering, and have a good switch of hair.

The chest should be broad and deep; this shows good respiration, essential to feeding and health. This, however, must not be taken in the sense in which we view it in the blood horse. It is then one of the essential points, necessary to fast and long continued exertion.

In the dairy cow, especially when viewed from before, there will be no appearance of massiveness. On the contrary, she will give an appearance of delicate fineness, and will look large behind, swelling gradually from behind the shoulders. She may not be closely ribbed, in fact should not



JERSEY COW.

be close, only comparatively so. The best milkers, every where, will be found to be rather loosely put together between the last rib and the hips, and good milkers must be roomy in the flank.

The hind quarters must be long from the point of the rump to the hock, and well filled up; yet this does not mean rounded and massive in flesh; on the contrary, the best milkers will be rather lean and perhaps high boned. Nevertheless, the same animal, when out of milk and fat, may fill up, and perhaps, present a fully rounded contour, while yet possessing all the delicacy of points characteristic of the high bred dairy cow.

A cow may have large and heavy ears; her back may not be fully straight from the withers to the top of the hips; her rump may be sloping; her tail may not reach the hocks;—all these are defects—the latter a serious one—yet, if the milking organs are super-excellent it will outweigh all these.

A phenomenon may show absolute perfection in all the points: we have never yet seen such an one. In judging, the essentials are to carefully consider each point of excellence with reference to its bearing upon the animal as a dairy cow.

A high open nostril would count but little as against a poor milk vein; a very delicate ear, nothing as against a very superior udder.

The Jersey, to the uncritical eye, when in full milk, is lean, scrawny, and misshapen; are so, fat or lean, from the standpoint of a Short-Horn

JERSEY HEIFER.

or Hereford breeder. The Short-Horn, or Hereford, is a gross, lubberly, disgusting, mountain of fat in the eyes of a Jersey breeder.

Color, Temper, and Size.

Do not be too particular about color; solid colors, and black points look well in the show ring. The animal that will turn out well at the pail, that is docile and gentle, be she what color she may, so long as she adheres to the distinguishing color-marks of the race, is the one for the milking yard.

In relation to size, the Jerseys are a small race of cattle. In no breed are overgrown animals the most valuable. With the Jersey it is especially to be avoided. So, an undersized animal is not to be countenanced. Fair size, however, is desirable.

He who seeks to increase the size of the Jersey unduly, will certainly go astray. They have been carefully bred, for many generations, with especial reference to milk.

The Jersey is the product of islands peculiar in soil, climate, and people. Transplanted to our lush pastures, with good shelter in winter, they will necessarily increase in size This is to be expected.

If you fancy "solid colors," and can get plenty of rich milk, with solid colors, well and good. If not, breed to whatever color, characteristic of the breed, which will give you this desirable result.

As a Dairy Cow.

The Jersey cow can hardly be called a dairy cow, in the general acceptation of the term. She lacks size to give quantity; as a cheese maker, she is not a success; as butter makers, they stand without equals, if quality be the test.

The butter globules of the milk are larger, and with a weaker covering than in other breeds; hence it churns quicker than the milk of other cows.

The milk, cream, and butter, of the Jerseys are yellower than that of other breeds. This is due to the excess of orange pigment secreted by this breed.

Jerseys are especially adapted to the villager, or family, requiring a medium quantity of rich milk, and superior cream and butter. They have taken kindly to our summer climate, from Maine to California. In winter, however, and in the early spring and late fall, they should be as carefully housed as Short-Horns, else they will fail to give satisfaction.

The cows are always docile, gentle, and tractable, when properly treated. It is not to be denied, however, that the bulls are often vicious. An enthusiastic writer has attributed this to their long lineage of aristocratic breeding. The Short-Horns are far more aristocratic in their lineage of ancient sires and dams; they are also notably peaceable.

It is a fact that animals kept in confinement are apt to become surly, and cross. The breeder of Jerseys must accept the fact that the bulls must be kept under strict discipline, and this by the exhibition of both firmness, careful handling, and gentleness.

VI Ayrshire Cattle.

The origin of these cattle cannot be distinctly traced. That Ayrshire, in England, has long been noted for a very superior breed of milking cows, is indisputable; yet anything like what were known as Ayrshires, fifty years ago, did not exist one hundred years prior to that time.

That the present breed was not produced by a cross of Alderney, on the native cattle of Scotland, as has been asserted, is evident enough from their form and characteristics; that they were not produced by selection, is equally as well grounded. They may have originated in a happy cross, and careful breeding thereafter.

That the Ayrshire owes much of its superiority to crosses of the better milking strains of the old Short-Horn race, would seem to be borne out, not only by tradition, but particularly by unmistakable characteristics of both these breeds.

Ayrshire indeed is eminently adapted to the production of superior milking cows. The climate is moist, with plenty of soft rains; consequently, the grasses would naturally be succulent, and tend to produce the greatest flow of milk of which a cow might be capable.

Of the three divisions of Ayrshire—Carrick, Kyle, and Cunningham—the latter is regarded as the true home of this most valuable breed. Indeed, they once went by the name of Cunningham cattle.

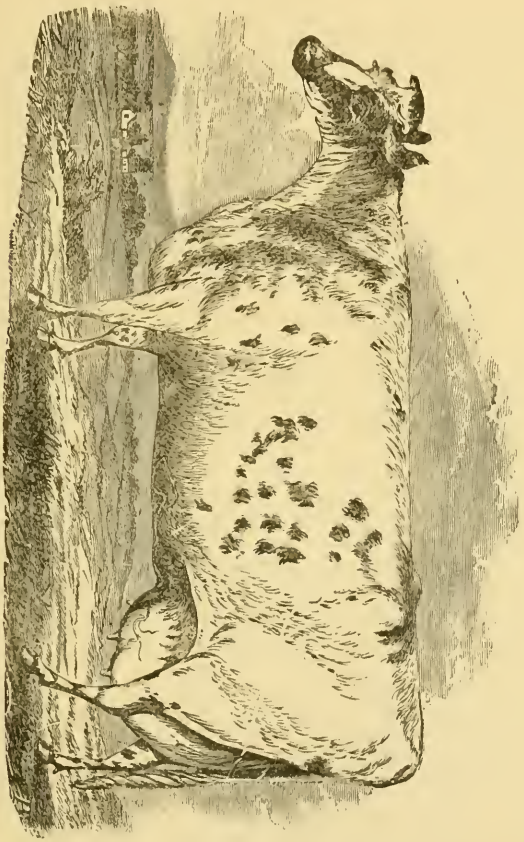
Ayrshires of the Last Century.

Mr. Aton, an old English writer, who has written more largely and intelligently than perhaps any one else of this breed, has given much valuable information concerning them as they existed in Ayrshire early in the last century. Speaking of them, he says:

"The cows kept in the districts of Kyle and Cunningham were diminutive in size, ill-fed, ill-shaped, and they yielded but a scanty return in milk; they were mostly of a black color, with large stripes of white along the chine or ridge of their back, about the flanks, and on their faces. Their horns were high and crooked, having deep ringlets at the root, the plainest proof that the cattle were but scantily fed; the chine of their backs stood up high and narrow; their sides were lank, short and thin; their hides thick, and adhering to the bones; their pile (skin) was coarse and open; and few of them yielded more than six or eight quarts of milk per day, when in their best plight; or weighed, when fat, more than from twelve or sixteen to twenty stone avoirdupois, sinking offal."

The *Husbandry* of Ayrshire, published in 1793, states upon the authority of Mr. Bruce Campbell, that the introduction of the improved breed was made by the then late Earl of Marchmont, and Mr. Youatt thinks that it must have happened between 1724 and 1740.

There then were successive introductions of improved blood among them, the Dunlap strain of Short-Horn about 1780, or one hundred years ago. This breed became well established in reputation, and in the early part of the present century became regularly known as Ayrshire, and was widely disseminated in England.



MODERN AYRSHIRE COW.

The above likeness is a good one of the improved or modern Ayrshire cow.

Mr. Aiton describes the breed in its improved form, or as it existed late in the last century, and early in this, as follows:

"The shapes most approved of, are—head small, but rather long and narrow at the muzzle; the eye small, but smart and lively; the horns small, clear, crooked, and their roots at a considerable distance from each other; neck long and slender, tapering toward the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind, the joints rather loose and open; carcass deep, and pelvis capacious, and wide over the *hips*, with round fleshy buttocks; tail long, and small; legs small and short, with firm joints; udder capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; the milk-veins large, and prominent; teats short, all pointing outward, and at considerable distance from each other; skin thin and loose; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned."

In this connection, it should always be remembered that the Ayrshire cows were always noted for their thighs, and in fact a general thinness of body, as compared with beef breeds. The bulls were always selected for their feminine appearance, especially about the neck and head; they were not required to be roomy behind; they were required to be broad in the hook bones and hips, and full in the flanks.

Tameness and docility of temper, hardiness, a sound constitution, plenty of spirit and life, and the capability of giving large messes of milk, rich in butter and cheese, are noted characteristics of this breed in an eminent degree.

Mr. Youatt says of them: "They yield much milk, and that of an oily, or butyraceous, or caseous nature; and that after she (a cow) has yielded very large quantities of milk for several years, she will be as valuable for beef as any other breed of cows known; her fat will be much more mixed through the whole flesh, and she will fatten faster than any other."

As far as milk is concerned, it is true of the Ayrshire of the present day.

In America, the breed has not yet been sufficiently disseminated to determine whether the quality of beef shall be borne out by the statement of the author quoted.

Mr. Youatt agrees that the breed has much improved since Mr. Aiton described it; that it is short in the leg, the neck a little thicker at the shoulder, but finely shaped toward the head; the horns smaller than those of the Highlander, but clear and smooth, pointing forward, turning upward, and tapering to the points; they are deep in the carcass, but not round and ample, and especially not so in the loins and haunches.

Some, however, have suspected, and not without reason, that an atten-

tion to the shape and beauty, and attempt to produce fat and sleek cattle, which would be admired at the shows, has had a tendency to improve what is only their quality as grazing cattle, and that at the certainty of diminishing their value as milkers.

Yields of Milk, Butter, and Cheese.

Experiments made early in the century, to determine the relative value of different breeds for milk and butter, we find as follows:

"In some experiments conducted at the Earl of Chesterfield's dairy at Bradley Hall farm, it appeared that, in the height of the season, the Holderness would yield seven gallons and a quart; the Long-Horn and the Alderney, four gallons three quarts; and the Devon, four gallons one pint, per day. When this was made into butter, the result was, from the Holderness, thirty-eight and one-half ounces; from the Devon, twenty-eight ounces; and from the Alderney, twenty-five ounces."

The Ayrshires average five gallons per day, and from that is produced thirty-four ounces of butter.

This shows the degree of superiority the breed has obtained in Mr. Youatt's time.

Mr. Aiton, indeed, asserted that 3 3-4 to 4 gallons of this milk would yield a pound and a half of butter, and that 27 1-2 gallons of milk would yield 21 pounds of full milk cheese; and that Ayrshires in their best condition and well fed would yield 1,000 gallons of milk in a year.

With respect to yield in the United States, we have the record that the first Ayrshire cow imported by the Massachusetts Society for the Promotion of Agriculture, in 1837, yielded 16 pounds of butter a week, for several weeks in succession, on grass feed only.

Mr. Rankin, a most reputable English authority, reporting upon a Kylo farm in Ayrshire, holds that Mr. Aiton's estimate is too high. In relation to two farms visited, upon one of which was kept from twenty to thirty cows, and on the other from thirty to forty very superior cows, he says of the first, that, "at the best of the season the average milk from each cow, is 9 Scots pints (4 1-2 gallons,) and in a year 1,300 Scots pints (650 gallons,); that in the summer season, 64 pints (32 gallons,) of entire milk will make an Ayrshire stone (24 pounds) of cheese; and 96 pints (48 gallons) of skimmed milk will produce the same quantity; and that 180 pints (90 gallons) will make 24 pounds of butter." Of the other farm, he states that "the average produce of each is 1,375 pints (687 1-2 gallons);" and adds as his belief, on the whole, that although there may be Ayrshire cows capable of giving 900 gallons in a year, it would be difficult to bring half a score of them together; and that in stocks

of the greater number, most carefully selected and liberally fed, from 650 to 700 gallons is the very highest produce of each in the year.

Upon his own farm, the size of which, he says, is of an inferior nature, his cows produce only 550 gallons in a year

Ayrshires in America.

The Ayrshires were first imported to the United States in 1831. They were different in appearance from what they are now, the colors being either deep red, or brown flecked with white, many of them having black noses. They have been materially changed since then, and vary much in color. The most of them, however, retain the characteristic colors of the breed, and whether they be dark red or black, they are generally more or less pied, mottled or blotched with white.

Mr. Allen, himself a Short-Horn breeder, in his work, "American Cattle," sums up the Ayrshires as follows;

"Their thirty-six years' trial here has been successful. They are hardy, healthy, well fitted to our climate and pastures, and prove good milkers, both as to the imported originals and their progeny. Their flow of milk is good in quantity and fair in quality; yet, we must be permitted to say, that in this country they do not yield so much in quantity as is alleged they have produced in Scotland. The chief reason for this is obvious. Ayrshire has a moist climate—an almost continuous drizzle of rains, or moisture pervading it—making fresh, green pastures; a cooler and more equable temperature in summer, and it is warmer in winter than with us.

Our American climate is liable to extremes of cold in winter, heat in summer, and protracted droughts, for weeks, drying up our herbage. These differences alone account for a diminished yield in milk from Scotch to the American Ayrshires. They have softer grasses for hay, and plenty of root-feeding in winter, which latter we have not. This fact of a diminished yield of milk on this side of the Atlantic is acknowledged by those most conversant with them in both countries.

In the year 1837, we visited the Ayrshire herd of the late Mr. John P. Cushing, at Watertown, near Boston, Mass. They were of the choicest quality, imported by himself, on an order sent out to an experienced dealer in Ayrshire cattle, "without regard to price, so they are the best." Two or three of the cows were "prize" milkers at home, and certificates, duly verified, were sent with them of the quantities of milk they had made. They had then been a year or more at Mr. Cushing's farm, and had the best of keep. We questioned the manager as to the quantities of milk the cows gave since their arrival, compared with the certificate. His answer was, "about one-third less, on an average. The best '*prize*' cow gave 33 quarts per day when at her maximum in Ayrshire, and 22 quarts

here, and the others in about like proportion, but they are all good milkers, and Mr. Cushing is satisfied with them."

We note the fact of the declension in milk of the Ayrshires in this country, knowing the same to have occurred with cows of other breeds from England. It is nevertheless true, we think, that the milk produced here is richer in the constituents, as it is undoubtedly true that cows on flush, soft pastures, or those fed on soft, sloppy food, give far poorer milk, although more in quantity, than when fed on shorter rich herbage, or upon other rich food.

Ayrshires in the West.

In the West the Ayrshires have not gained the celebrity that the Jerseys or the Holsteins have. The probability is that the Jerseys owe much of their popularity to the fact that they are *par excellence* the family cow, where quality of milk has greater weight than quantity. The latter are hard keepers; that is, they consume a large amount of food for the quantity of milk given, and probably more than either the Ayrshires or Holsteins for the quantity of butter and cheese produced. The Jersey must have rich food to enable her to sustain herself. Nevertheless, the texture, solidity, hardness and delicacy of the butter amply compensates for this. The Holstein has grown in favor in the West rapidly within the last few years. Our abundant pasture and cheap forage and grain in winter, has made them prime favorites with all that class who must have a large quantity of fairly rich milk. As a cow for making cheese they are unsurpassed, as is the Jersey for butter. For a great flow of milk, rich in butter, our experience is that the Ayrshire carries off the palm, especially on pastures not good enough for the Holsteins.

Description of Ayrshire Points.

In judging cattle of any description, reference must always be had to the characteristics of their breed. Thus, while all cattle are judged by certain undeviating standards as respects feeding and assimilation, beef cattle must be judged from a beef-making standard, and dairy cattle from their milk-producing powers. It is more than probable that, weight for weight, the Ayrshire being a cow of medium size, will produce more milk than any other breed. In selection no surer test can be had than a careful study of her points. Dr. G. Lewis Sturtevant, of South Framingham, Massachusetts, who has given the Ayrshire particular attention, and who is one of the most careful farmers and breeders in the East, thus describes the Ayrshire, and the same principles may be applied to the whole race of dairy cattle.

Usefulness.

The usefulness of the dairy cow is in her udder, and toward the udder, its shape and its yield, all the capabilities of the cow should be directed. We may first view it as a reservoir for the milk. As such, it must be large and capacious, with broad foundations, extending well behind and well forward, with distinct attachments; broad and square, viewed from behind, the sole level and broad, the lobes even-sized, and teats evenly distributed; the whole udder firmly attached, with skin loose and elastic. Such a form gives great space for the secreted milk, and for the lodgment of the glands, while allowing the changes from an empty to a full vessel. The glands should be free from lumps of fat and muscle, well set up in the body when the cow is dry, and loosely covered with the soft and elastic skin, without trace of flabbiness. Such a covering allows for extension when the animal is in milk, while the glands are kept in proximity with the blood-vessels that supply them. The necessities of the lacteal glands are larger supplies of blood from which milk can be secreted, and this harmonizes with the demands of the udder as a storehouse. For broad attachments means broad belly or abundance of space for the digestive organs, from which all nutriment must originate. The blood is furnished to the glands of the udder by large and numerous arteries. As secretion is dependent on the freedom of supply of blood to the part, and a copious flow, we find branches coming from different arterial trunks and freely anastomozing with each other. Although these arteries are internal and out of sight, yet fortunately the veins which carry the blood from the udder pass along the surface, and from their size and other characteristics indicate the quantity of blood not only which they carry away, but which must have passed through the glands from the arteries. These return veins pass both backward and forward. Those passing forward are known as the milk veins, and the size of these superficial veins on either side of the belly, and the size of the orifices into which they disappear, are excellent *points* to determine the milking probability of the cow. Still better is it to find, in addition, the veins in the perineum, which also return from the udder, prominent and circuitous.

Escutcheon.

The escutcheon is now generally conceded to be a good indication of milk in the cow. This mark is sufficiently well known not to require description in detail. I think a broad escutcheon is fully as good a sign as a long one; that quantity or quality mean more than shape, yet I would not discard the shape entirely. One error must, however, be avoided. It may be well to compare the size of escutcheon of cows of one breed,

but never to compare the size of escutcheon in cows of different breeds. I think this point means more relative to size in the Ayrshire than in the Holstein or Dutch; and I am certain that while it may be safe to follow it in the Ayrshire in the majority of instances, it would be equally unsafe to adopt it in selecting a Short-Horn, for the obvious reason that that breed has been bred for generations for other purposes than the dairy.

The udder and its dependencies, the milk veins, and the escutcheon mark, may be considered the foundation of the Ayrshire cow. These influence profit, and also the shapes of the body and the form of the animal. The milk vessel is placed in the pubic region of the cow, and is protected on either side by the hind limbs. The breadth of its attachments secures breadth of body, and the weight requires also a depth of quarter and of flanks. The breadth below requires breadth of hip above, and length of loin here appears related to length of pelvis. So much for the physical portion. The physical function of milk-producing demands a great and continuous flow of blood, for it must not be forgotten that *milk is blood*, so to speak. This flow is dependent on the supply of food, and on the facilities of digestion. To gain this, a large body is required in order to hold the suitable digestive organs.

"To gain further room for these, we desire to see arched ribs, depth, yet no heaviness, of flank, and breadth of hips which we see was also required for the broad udder. To sustain this body, a strong, firm back is needed. To gain the most of our blood after it has absorbed the chyle from the digestive organs, reason shows that it should find its way freely and speedily through the system on its labors of supply and removal, cleanse itself in the lungs, and again pass on to its duties. All this points to a healthy heart, not cramped, and lungs of sufficient capacity: for the yield of milk drains much nutriment from the system, and the constitution must needs have the vigor given by healthy and active heart and lungs. In this way the chest is correlated with the udder.

"The reproductive functions require hock bones of good size, and a broad pelvis is desirable, as underlying within are the generative organs.

"Thus the necessities of the body of a good milking cow require the wedge shape, and this not only from the flanks, but also when viewed from above."

A Summing Up.

The points of the Ayrshire cow, as given by the Ayrshire Agricultural Society, and the New York State Agricultural Society, have been summed up as follows:

The Body.

"The whole fore-quarters thin in front, and gradually increasing in depth and width backward, yet of sufficient breadth and roundness to insure constitution; back should be straight and the loins wide, the hips rather high and well spread; pelvis roomy, long, broad and straight, hook bones wide apart; quarters long, tolerably muscular, and full in their upper portion, but moulding into the thighs below, which should have a degree of flatness, thus affording more space for a full udder; the flanks well let down, but not heavy; ribs, behind, springing out very round and full, affording space for a large udder—the whole carcass thus acquiring increased volume toward its posterior portion.

"We see that the points as given are those of utility, and that at this stage the udder-points and body-points are correlated.

The Skin.

"In connection with the body and the udder, the skin is of great value in assisting our judgment. Between the portion of the external covering used for leather, and the muscle, there occurs a layer of cellular tissue, which contains a larger or smaller amount of fat cells, and the mellow handling caused by these cells indicates a free circulation throughout this meshwork.

"The skin varies from a thin, papery hide, covered with silky hair, to a thick, supple, elastic hide, well coated with hair, on the one hand, and a similar variation, with harsh hair and coarseness, on the other. The thin, papery hide indicates quick fattening and a delicate constitution; the thick, elastic hide cushioned on fat, and which on the flank comes into the hand almost without grasping, indicates the height of vigor, accompanied by the fattening tendency, and the possessor of this handling endures climatic changes, low quality in his food, and neglect, with remarkable hardihood, and quickly responds to full feed and good care. The harsh handler is a dull feeder, consumes much food, and generally contains more than a just proportion of offal or waste. In the Ayrshire cow we desire neither of these extremes, for it is in the milk product that we wish the food to be utilized, and it is almost an unchanging law of nature, that deficiency in one direction must be compensated for by excess in another direction, and *vice versa*. At any rate, the cow that lays on fat too quickly is seldom a first class milker; and how well known is it that the cow of large yield milks down her condition! A cow that has a moderately thin, loose skin, of sufficient elasticity and suppleness of touch, without being fat-cushioned, as it were, with hair soft and mossy, or woolly, if of correct form otherwise, will usually milk

a large quantity, and when she becomes dry, will rapidly come into condition. In truth, the handling of the Ayrshire cow must be good; it cannot be too good; but it must not be of exactly that quality sought for in the grazing breeds.

"There, as everywhere, the dairyman must keep to his line; milk, not fat, is his profit; and in seeking excess of both, he will be liable to fall below the average of either."

Relating Especially to Milk.

It is an axiom of breeders to diminish the useless parts of an animal as much as possible, or, in other words, to reduce the proportion of those parts not conductive to profit to as great extent as possible. Applying this rule to a dairy breed, we should desire a small neck, sharp shoulders, small brisket and small bone. Moreover, small bone usually accompanies thrift, and is universally found in improved breeds. We thus have a reason for these other Ayrshire points, which I now quote:

"Shoulders lying snugly to the body, thin at their tops, small at their points, not long in the blade, nor loaded with muscle; brisket light; neck of medium length, clean in the throat, very light throughout, and tapering to the head; tail long and slender; legs short, bones fine, joints firm.

If the dairyman's policy were otherwise, he would have to supply extra food for the support of parts useless to him, and whose larger development is of no especial value.

The Head.

"The head should be small, in shape either long and narrow, or broad in the forehead and short, according to the type of animal preferred by the breeder, generally preferred somewhat dishing; the nose tapering to an expanded muzzle, with good clean nostrils. Opinions differ as to the general shape of the head. A broad forehead and short face occurs more frequently in bulls, and is generally esteemed a masculine characteristic; a more elongated face is called feminine. Yet some families of well-bred and good milking Ayrshire cows have the broad and short head, and such were, at one time, if not now, the favorite in the show-yard in Scotland.

"The eye should be moderately full, lively yet placid looking. The eye is a mirror of the disposition, and interprets the character of the cow; a fretful, irritable animal is seldom a quick fattener, and usually disappoints at the pail. It also gives expression to the features, and physiognomy aids our judgment.

"The ears should be of a good size, but thin, and their skin of rich yellow color. Coarse ears are usually found on ill-bred animals, and these may be considered, to a certain extent, indicative of general coarseness. The color of the skin, as shown inside the ear, is usually considered indicative of the richness of the milk in butter.

"The horns should be of medium size, of fine texture, with an outward and upward turn, or inclining upwards and curving slightly inwards, according to the taste of the breeder. They should be set on rather widely apart. A coarse horn may indicate a coarse and thick hide, as there seems an intimate relation between the composition of the horn, hair, and hide, and the influence of climate on horn and hair gives an appearance oftentimes of correlation between the two.

The Top Points.

"The neck should be of medium length throughout, and tapering to the throat, which should be clean or free from loose, hanging skin. Yet too thin a neck is not desirable, as it usually indicates a delicate animal. A thick-set neck, well covered yet not overladen with muscle, accompanies hardiness and vigor of constitution.

"The junction of the neck with the body and over the shoulders is called the crops; on a horse it would be called the withers. A hollow behind this point is a never-failing sign of weakness. The crops should blend in easily with a thin shoulder, lying snugly to the body. This shoulder and a well defined spine produce the sharpness of shoulder so much admired. The back should be straight, with spine well defined, especially forward. The tail long, firm in the bone, and set on a level with the back, without depression or notch. A fine tail usually accompanies fine bone, and the fine bone is not only decrease of offal over heavy limbs, but accompanies early maturity, and a tendency to thrift. The limbs should be fine-boned, flat-boned, and with joints of moderate size. On the forward limbs the cow should stand low. Large joints and round bones are found very frequently on dull feeders and on animals of little profit.

The Teats.

"The teats should be of medium length, evenly set, and project slightly outward when the bag is full, of even thickness throughout, and of fine texture. They should be placed about one-third of the length of the "vessel" apart in one direction, and about one-half the other. When the udder is not distended, they should hang perpendicularly. Large teats, however desirable to the milker, are usually accompanied by

coarseness of build in the cow. They are seldom found on well-bred animals, yet exceptionally they occur, and are much liked. A teat should be large enough to grasp, say from two to two and a half inches in length. A shorter one would be an objection; with larger, I should fear coarseness.

Color and Carriage.

"In color the Ayrshires vary greatly. Brown, red, and white appears to good advantage, and is fashionable. A good quantity of white, well distributed, adds style and showiness to the animal. Yellow and white is frequently seen, yet while this color is sometimes stated as indicating lack of hardiness, I am not aware of any proofs of argument having been brought forward to support this view. Color is as yet a matter of taste, for its correlations are hardly guessed at; and from almost pure black, through the reds to almost pure white, are colors found on the best cows. Black spots on the skin, barely perceptible through the hair, often occur on the best cattle. Strawberry-blotched and red and white are perhaps the more common colors. A self-colored animal, or a roan, or animal with white on the ears, the writer has never yet seen among the Ayrshires in Scotland or in this country, when the pedigree was unquestionable.

"The carriage should be light and active, the head well up, and the hind legs should not cross in walking. The condition should be neither fat nor lean, but that average which a good cow holds when in good flesh at calving, liberally fed while in milk."

Holstein Cattle.

Dutch cattle were undoubtedly among the first cattle ever brought to America. Canada was visited by the French in 1808, when they founded Quebec. Soon after colonists arrived and brought with them the little Normandy cattle. The English first settled on the James river, in Virginia, in 1607, and New York was settled by the Dutch in 1614. In 1625 the first cattle were imported from the mother country, and they were undoubtedly the Dutch cows noted for milk, or a race nearly allied to what are now generally recognized as Holsteins. That this supposition is correct is probably true, since these cattle were considered valuable for milk and labor. It would naturally follow that these two qualities should be considered of prime importance by the practical Dutch settlers, in a country where game in abundance might be had by all who knew how properly to aim a gun.

History of Holsteins.

In the adaption of breeds to special purposes we must always bear in mind that feed, climate, care, and careful breeding must be taken into consideration. Thus for the most excellent dairy cattle, we must look to countries noted for dairy products. In such districts will always be found tolerably uniform and excellent milkers. Really scientific breeding has not been practiced until within a very few years. It was more experiment than anything else. Yet so long ago as 1625, England, Holland and Switzerland were noted for dairy products, and also for breeds of deep and lasting milkers. As education increased, and wealth became more general, improvement by selection was supplemented by a careful study of certain points and characteristics that might be expected to perpetuate themselves. Thus we now have the Jerseys, the Ayrshires, the Swiss cattle, and Holsteins, each specially adapted to the soil and requirements of their respective localities. The Holstein cattle, or those of North Holland, are noted for large frames; for being of two distinct colors, black and white mixed. They belong to the great short-horned division of cattle, which race, from the best accounts extant, would seem to have been peculiar to the transient inhabitants of Germany from time immemorial, and to have been carried with them in all their migrations.

The size, adaptation to districts yielding strong, plentiful herbage, and extraordinary milking qualities, have made them universal favorites in the West, and wherever introduced in all that great country of the Northwest that of late years has so suddenly become celebrated for its dairy products. Within the last century this breed, like all other pure breeds, has been wonderfully improved by the astute and practical Hollanders, so that it may now be called as distinctly a breed as any other of the more reputable families. Like the Durham and Teeswater cattle of a hundred years ago, they were then noted for a fair uniformity in appearance, and as deep milkers, good at the yoke, and as making heavy weights of fair beef when ready for fattening. The general characteristics of these two breeds would seem to point conclusively to the fact that originally they had a common ancestry in cattle belonging to the ancient races inhabiting the north of Europe, and that they were carried wherever these people, in their wanderings, migrated.

Improvement.

We have no definite knowledge when this wonderfully constituted short-horned race of cattle first became broken up into the various families that have of late years become celebrated both as dairy cattle and as beef cattle. It is probably within the last three centuries that

systematic attempts have been made to breed them with a view to their careful improvement and toward fixing their characteristics — in England with the Durhams, now known as Short-Horns, and in Holland with the Dutch cattle, now known in the West through the importation of the Holsteins, from the fact that in this district more care seems to have been taken to breed their cattle, not only to type, but also in line as dairy cattle. It takes long generations of such breeding to fix undeviatingly peculiar traits and characteristics, so they may be transmitted with great fixity to the resulting progeny. The Holsteins of the present century have presented uniformity, and to-day they may be called as persistent in the transmission of quality as the other great families of the *genus Bos* in any country.

These have superior excellence in their milking qualities. They are dairy cows noted for giving enormous quantities of fairly rich milk. They have massive compact frames, and make good beef; as working oxen, from their strength, docility, patience, and fairly active habits, they should make excellent workers: The horns of the Holsteins are short. The hair short, soft, and fine. The hides are of moderate thickness, of good texture—that is, mellow. The color should be always black and white, either in bands, or else pied, mottled or spotted over the body. The udders of the cows are capacious, of great breadth and depth. The teats well shaped and standing well apart. The milk-veins prominent, large, and running well forward.

Holsteins in America.

As we previously stated, the old Dutch settlers of New York brought over with them this valuable breed of cattle. They have, however, become entirely lost, except that they have left their impress in resulting generations of mixed blood.

Since the time noted, there probably were none imported until the present century. In the early part of the century, at the time of the importation of Merino sheep, by Mr. William Jarvis, of Vermont, in one of his voyages he brought over a bull and two cows. They remained on his farm for some years; the bull was bred to the common stock of the country, producing a decided impress, but at the end of a few years the pure blood was lost.

It is recorded, that, somewhere between 1820 and 1825, Mr. Herman Le Roy, a public spirited merchant of New York city, imported some improved Dutch cattle which were sent to his farm near the city. Between 1827 and 1829, some of the produce of this herd were sent to the farm of his son, Edward Le Roy, on the Genesee river. Mr. L. F. Allen de-

scribes this herd in 1833, as he then saw them, as being large, well-spread cattle, black and white in color, and remarkable for their uncommon yield of milk, and of great value as dairy animals; their qualities in that line were universally acknowledged wherever known.

About Dutch Cattle Generally.

In treating of Dutch cattle we have adopted the name Holstein, and for the reason that in the West certainly the importers seem to have fancied the cattle found in Holstein, and to have imported more largely of them than any other of the Dutch cattle. That the right name for all those families of ancient lineage, bred in North-Holland, and recognized as having been for many generations great milkers and as making heavy beef cattle, of good quality, when dry, should be Dutch cattle, there is, from the testimony, little doubt. So also it would seem that the Holstein cattle are a sub-race of the older Dutch, as the following letter from Prof. J. G. Hengweld, of the Netherlands Royal Veterinary Institute, to Mr. Charles Muller, United States Consul at Amsterdam, would seem to show. This is dated Utrecht, November, 1872, and published in the Report of the ——— on Dutch Cattle in Agriculture of Massachusetts, second series, 1873-74. From it we extract as follows:

Quoting from Low's Agricultural History of the Domestic European Animals, etc., he says: "In comparing these varieties of cattle to the breeds of the Continent, there is an analogy found on the one side between the great breeders of the marshes and the black cattle, natives of the plains and marshes of Holland; and on the other, between the more various kinds on the north of the Humber and those of Holstein and Jutland, whence the best cattle of Northern Europe have sprung." It is not unreasonable to suppose, that these latter breeds may have been introduced during the first period of Saxon colonization by the Jutes and Angles, who settled down in that part of England. But at a more approximate period to us, it appears that cattle were frequently imported from the neighboring continent, and that they were mixed with native breeds.

It was especially the Dutch cows that were considered the best milch kinds of Northern Europe.

There is here a very clear and evident difference made between the excellent Dutch cattle and the Holstein and Jutland breeds whose origin Low traces to a Saxon colonization. How Low, a few lines further on, can make the Dutch cattle derive their origin from the Holstein cattle —from which lines the 'herd book' draws its inference (the same occurs in the French version, 'whence the best Dutch races themselves originate')— is incomprehensible; and it is evident Low errs, or is not sufficiently ac-

quainted with the history of both countries. For already seven centuries before the colonization in England, of the Jutes and Angles, the Friesians [Hollanders] were known for the greater number of their cattle, as will further appear.

Every Spring, thousands of Holstein heifers are driven to the fields of Northern Germany and Holland, where people find it is more profitable to buy heifers than to raise them; and the name of the breed got confused, so that the name "Holland cow," was here translated into "Dutch cow," etc.

About Herd Books.

The "herd-book" takes the unwarranted liberty, whenever it should speak of Dutch cattle, of adding immediately after, the word "Holstein." It gives to Holstein cattle *purchased in North Holland*—and of which the first importation took place in Massachusetts in 1852, afterward in 1857, etc., but the greatest in 1861—all the honor the Dutch cattle so abundantly deserve, and appears to have made the geographical blunder of supposing North Holland, Friesland, Groningen and Oldenburg as belonging to Holstein.

The thesis so arbitrarily adopted and set forth by the "herd-book," that the large black and white cattle imported into North America from the Netherland provinces of North Holland and Friesland have "undoubtedly descended from the original stock of Holstein," as it proclaims on page 9, requires a most decided denial and refutation for the honor and reputation of Dutch cattle; and, without being led astray by the most strangely jumbled-up references mentioned, I wish to point out,—

True History.

1st. That the history of the Dutch or Holland cattle dates further back than that of Holstein.

2nd. That the Holstein cattle descended from the Dutch; and

3rd. That the name of "Holstein cattle" is only a local appellation for a peculiar indigenous breed, constituting only one of several appertaining to the same group, namely, to the groups of the Lowland races, of which *the Dutch breed is the fundamental type*. To this I now proceed.

According to the "Allgemeine Deutsche Real Encyclopedia," the origin of Holstein Schleswyck lies buried in obscurity, and Holstein was probably visited by the Cimbri; while a century after, the Roman Emperor, Cæsar Tiberius, arrived with his army and fleet before the mouth of the Elbe, without, however, setting foot on the Holstein shore. According to Tacitus, it may be stated, that the Holstein Baltic coast was

inhabited, as far as Mecklenburg and Schleswyck, by seven petty German tribes, of whom the Angles and Warnes have preserved their names down to the present time; while the others have been melted down into that of the Saxons. In the fifth century, the Saxons and Angles united with the Jutes and Friesians, and migrated to England. (This is Low's colonization.) Subsequently, the Holstein Saxons, who dwelt to the north of the Elbe, were called by the name of Normans; while the name of Holstein is not mentioned in history before eight hundred years after Christ. In 1128–64, the Holstein province Uagrien was conquered and converted to Christianity, and partly peopled with strange colonists from Friesland, Holland and Westphalia.

It appears that, with regard to its fitness as a grazing and cattle-breeding country, Holstein is of later date than Holland; which fact will appear the more prominent after some account has been made of the oldest inhabitants of Holland and their pursuits.

What History Says.

For this purpose I at once direct the attention of the reader to the coming of the Friesians and Batavians. The former were the oldest inhabitants of Holland, and were known as herdsmen, hunters and fishermen. Their history in this country goes as far back as 300 years before Christ. The Batavians came 200 years later (100 years before Christ) down the Rhine; and, although they were likewise herdsmen, they occupied themselves more particularly with hunting and fishing.

The lands of the Friesians comprised the whole country to the north of the Rhine as far as the shore of the North Sea, to which West and East Friesland belonged, composing the present Dutch provinces of Groningen, Friesland, Dreuthe, and North Holland, besides the provinces of Utrecht, Overyssell, and a part of Gulderland and South Holland. Of all these provinces, Groningen alone appertained to East Friesland.

Tacitus says of the Friesians and Batavians: "They owned cattle, not excelling in beauty, but in number." He further states, as does also Julius Cæsar, that the Friesians and Batavians paid each other in cows, sheep and goats, and gave likewise to their children as dowry, oxen adapted to the yoke and plough, cattle and horses. When they were subdued by the Romans in the first century of our era, the conquerors derived much advantage from this wealth in cattle, and imposed upon the Friesians an annual tribute, consisting of cow-hides and meat; while they chose their most valient warriors from among the Batavians.

The Friesians and Batavians applied themselves to the draining of their marshy lands and their islands, created meadows on the reclaimed soil,

which they first protected against inundations by raising hills, breakers and dikes, of which the traces are everywhere discernible along the coast throughout West Friesland and Groningen. Something is even known regarding the color of their cattle, namely, that they held those of a white color in religious veneration. It is a very plausible theory that the Friesians, who, at as early a date as three hundred years before Christ, peopled the north of the present Netherlands, and wrought those alluvial plains of Scandinavian clay into soil fit for the requirement of their cattle, did, in after-centuries, spread themselves in more northerly and easterly directions as far as the Elbe—as we already know they did, in the fifth century, unite with the Jutes and Anglo-Saxons in emigrating to England; in addition to which, we must observe that these were probably East Friesians and not West Friesians.

The Friesians, from Oldenburg and the country near the mouth of the Elbe, both south and north of that river, were compelled, through the inclemency of those regions—then in their original condition of low alluvial swamps, inundated at every tide—to desert them. It was owing to these local circumstances that the Romans were prevented from endeavoring to land their army.

It can be shown that the inhabitants of this territory were unable to make sure provision for their own wants because of the robberies and piracies committed by the Normans, dwellers on the west coast of Denmark, people from Holstein and Schleswyck, Jutes and Angles. These were by no means peaceful breeders of cattle, as were the Friesians and Batavians, whose lands they constantly plundered and laid waste, burning and ravaging their possessions, massacring the inhabitants, making them pay tribute, penetrating far inland to the mouths of the Rhine and Yssel, and everywhere giving unbridled vent to their ferocity and love of plunder. This was between the eighth and eleventh centuries. Giving due weight to these statements, which, from the nature of the case must be necessarily brief, it cannot be doubted that the cultivation of cattle in the Netherlands existed a long time before such a thing could be thought of in Holstein. It is also quite as certain that the colonies from Friesland, Holland and Westphalia, carried with them their cattle to Holstein.

Hence we see that, first, the Dutch race of cattle date from an older descent than those of Holstein; while, probably, second, the Holstein cattle originated from the Friesian breed and from that of the Dutch and Westphalian emigrants.

After this colonization, we have our attention directed to another remarkable particular in the history of the Dutch cattle cultivation.

Regular Markets Established.

From the fourteenth on till the eighteenth century, a large number of Danish oxen were annually turned for pasture into the grassy meadows of North Holland—formerly West Friesland, and sold at the weekly North Holland cattle market. The oldest of these cattle markets is that of the city of Hoorn. This market was already established in 1311, and in 1839 the Danes and the inhabitants of the Eyder were allowed by Albrecht, duke of Bavaria, to hold a weekly market there. In 1605, the Danish cattle market was removed from Hoorn and transferred to Enkhuyzen, when, in 1624, the number of 1,179 oxen were sold. There was also in Amsterdam a lean-cattle market, beginning in the Spring, in the month of April, but held at irregular periods, depending upon wind and weather, when cattle were allowed to be conveyed from Denmark and Holstein hither to graze. These were mostly brought by vessel. Mr. Hengeveld says:

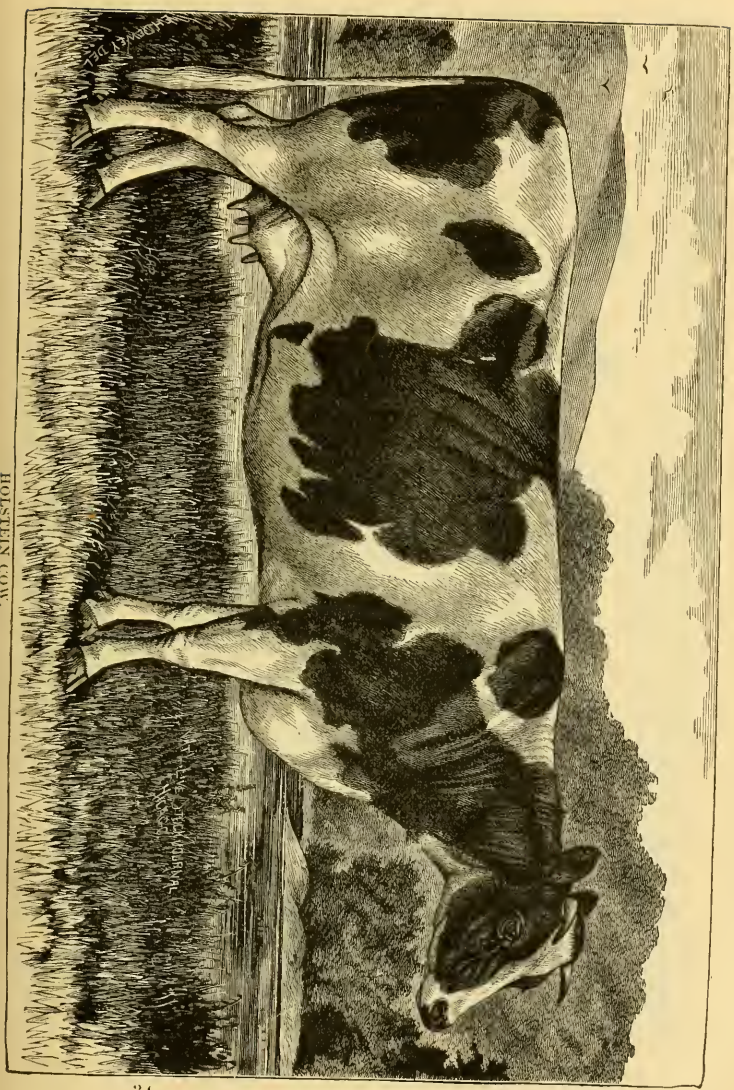
"These importations of Danish and Holstein cattle into North Holland, to which the 'herd-book' might refer, did not consist of 'heifers' but of lean oxen, which were pastured on the fertile meadows of the Polders, and afterwards sold at the markets of Hoorn, Enkhuyzen and Amsterdam as fat cattle. As to heifers, either then or now, having been imported from Holstein into Friesland and North Holland for the purpose of breeding, no such thing is known."

To withhold nothing, and to put nothing in a distorted light, I may add, that in the middle of the 18th century several importations took place into Friesland of Danish cattle, consisting of young calves. This was at the time of the raging of the cattle-plague, which desolating disease carried off thousands of the finest cattle in Friesland and Holland.

For the purpose of keeping the cattle trade alive, and to fill the places of those destroyed by the plague, small Danish breeds and German cows of diminutive size were substituted and crossed with the remaining and recovered natives.

"They were," says Scheltma, "Danish, Holstein and small German cows, of which the greater part were smaller in size than the native race." In the same work we find, "that one was reduced to the necessity, in 1769, of purchasing the needful cattle in the county of Bentheim, in the district of Oldenburg and Munster, in Hanover and other parts of Germany."

In the work, "Present State of Friesland," it is mentioned that, "owing to the cattle-plague, the people were compelled to in port from abroad all kinds of *small* cattle, chiefly Danish. But, what was remarkable, however small and ill-favored these animals might be, when com-



HOLSTEIN COW.

pared with the handsome Friesian horned cattle, as a natural consequence, an improvement of food induced a favorable development of body, and, from the mixture of the two breeds, good and choice milch-kine were attained within two or three generations of the introduction of the foreign blood, no matter how much the race had in the beginning deteriorated through the process, and, eventually, the type of Danish and German cattle was quite lost." This is, however, already one hundred years ago.

A fair consideration of what has been thus far stated will leave no justification of the "herd-book's" imputation upon the antiquity and purity of descent of our Friesian or Dutch cattle; or its assumption that they are of Holstein origin. No; the genealogy of Netherland cattle is pure and unadulterated, and it is at least two thousand years old.

Facts as to Dutch Cattle.

Our authority continues as follows:

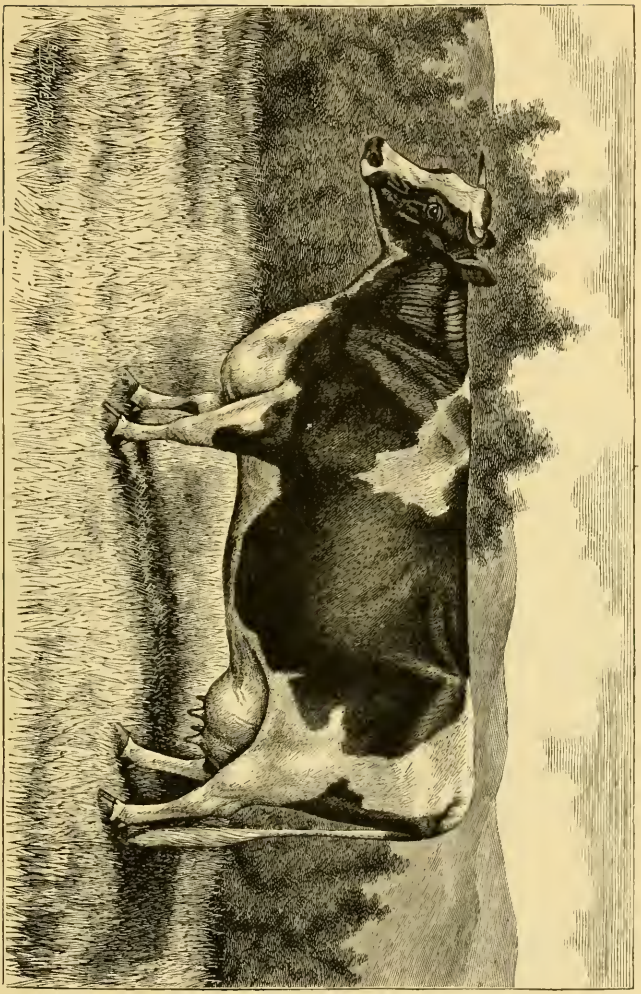
"I come now to the present time, and the question whether it is tenable to give to one variety of cattle the name of an entire group, and to reckon as appertaining to it all its several varieties or breeds,—as, for instance, the Dutch, Friesian, Oldenburg, Holstein, etc.,—and would it not be imperative in such a case to give it the purely historical name by which it is generally known? If it could be desirable to give a general name to the cattle of the just mentioned districts, then that of Holstein cattle would not be appropriate, and for it should be substituted that of *Friesian cattle*, whence all the varieties originated.

"The chief characteristics of this Friesian breed—its eminent milk-giving and fattening qualities—we find in all the just mentioned districts, and extending still further southward: with this difference, however, that wherever the land is more fertile, the climate milder, and the tending, feeding and breeding of the cattle observed with more care, in that measure, and according as these requisites stand to each other in the closest proportion and harmony, they are more developed, attain larger size and are of a finer texture.

"If the intention be to convey a correct understanding of the true qualities of the several varieties or breeds mentioned in their own dwelling places, it is better that each breed should retain the name by which it is known, and that no collective name, though a historical one, should be given them.

"In order to be able to readily classify a group of cattle of great extent, possessing the same chief qualities in form and productiveness, Sturm* proposed, so long as fifty years ago, to give to a group, subject

*Dr. Sturm: "Of Races, Crossing and Improvement of Indigenous Domestic Animals." Elberfield. 1825.



HOLSTEIN HEIFER, 2 years old

to the same conditions of soil and climate, a name indicating those conditions, and thus originated Mountain Cattle, Highland Cattle, and Lowland Cattle. He also heads each of these divisions by the breed best representing the distinctive feature of its class, *as its type*. It is under the denomination of Lowland Cattle that he places the different breeds of the coast lands along the North Sea. Schmalz, Pabst, and many subsequent writers, adopt this classification; some with a few modifications, but all in the physical characteristics of the country to which they are indigenous, the general denomination of the collective group, according to Schmalz's statement, cattle, adopting Sturm's classification, may be distinguished in the following manner:

Races of Dutch Cattle.

"A. Lowland Race.—Primitive cow; Dutch-Friesian cow.

"B. Mountain Race.—Degenerate, quite the contrary of A; Swiss cow.

"C. Middle Race.—Highland race; forms the transition from A to B; Frankish cow.

"Schmalz says, 'To the race A belong the *Dutch, as representatives*, the Friesian, the Oldenburg, and chiefly all Lowland races bearing the peculiar characteristics which identify it with the place of its sojourn.'

"This is a purely natural division, and there is not the least arrogance in asserting, what history points out, that the Dutch cattle constitute the type of the oldest, purest, and best breed. All other varieties are of less intrinsic value; they are coarser or smaller, possess less productive qualities, though of local excellence in their native places. '*If cattle of the genuine breed are bought, imported elsewhere, and there bred, why is it not called by its native name, and why must an appellation be given to it quite foreign and unknown to it?*'

"One hears in Europe of 'Lowland cattle,' but purchases of them for the purpose of improving other breeds have, for the last hundred years, been only made in the chief Netherland provinces, where the choicest cattle of the Lowlands are found. Thus, thousands of Dutch and Friesian cattle are annually sent abroad under the name of *Dutch cattle*."

Dr. George May's Testimony.

Finally, I beg to add quotations from Dr. George May,* director of the agricultural establishment at Weihenstephan, who visited Holland about ten years ago.

"The Dutch cattle constitute the type of the properly so-called Lowland

*Dr. George May: "The Cattle." Munich. 1863. Vol. III., p. 38.

race, which extends throughout Netherlands, Flanders, Normandy, Oldenburg, and Denmark. The Oldenburg cattle descended from the Dutch race, and are likewise distinguished as East Friesian cattle, as still partially found in Hanoverian Friezland. In the adjacent parts of Bremen it is called Bremen cattle." "The Holstein and Breitenburg cattle in the Wilster and Rempner markets are equal to * * * ; but with respect to their square build, the Breitenburg cattle are in their properties more like the finer Dutch cattle."

Other writers of repute may be quoted, but enough has been given to show that the name of "Holstein" is only a local, and not a collective name, and may not be given to cattle bought in North Holland. To do so is to underrate the Dutch cattle race.

Mr. Klippart's Testimony.

In relation to the native cattle of Holstein, the lamented Klippart in his Ohio Agricultural Report of 1865, says:

"The native cattle of Holstein are the Angle cattle, which are far more numerous than any other kind or race. They are small animals, with fine bones, short legged rather than otherwise; a very fine, small head, and delicately formed neck. The predominating color is red or brown, but there are many dun, black, or spotted ones. According to the amount of food consumed, this race give a more abundant supply of milk than any other in the duchies. It is a very highly esteemed race—is much sought after for its milking qualities and kindliness in taking on flesh. The flesh is very fine, tender and juicy. On account of the great demand for stock of this race, cattle dealers have not unfrequently gone into Jutland and other points, and made purchases, which they represented as being genuine Angles; but in recent years a law has been passed that every breeder of Angle stock must brand the calves with the letters A. R. (*Angle Race*,) in order to prevent impositions.

"In these marshes are found a race of cattle much larger and heavier than the Angles, larger boned, and of a dark, reddish brown, and known as the Marsh race. This race seems to be adapted to the marshes, but does not do well on the higher and dryer uplands. Upon the rich pastures of the marshes, for a time after calving, the best cows will give from forty-eight to sixty-four pounds, (from six to eight gallons), of milk daily. But the milk is not near so rich as that of the Angles;—in fact, I was shown a statement, apparently well authenticated, to the effect that milk of the Marsh race contained no more than two per cent. of cream, while that of the Angle race contained sixteen per cent. One thing is very certain, namely: the butter of the Marsh race is not near so sweet or 'nutty' as that of the Angle race.

"In Schleswig, rather than in Holstein, are found many of the Jutland race of cattle. These have very fine bones, and are long in proportion to their height, and are, as a rule, short-legged. The prevailing color is gray, black, or gray and black mixed with white, but very rarely red or brown. This race is more highly esteemed for its early maturity and readiness to fatten than for its milking qualities."

In the transaction of the Ohio Board of Agriculture, 1872, in an article on Dutch cattle, by Professor Furstenburg, we find the following: "The breeds of cattle in Holland may be divided according to their locality as follows: 1. The breeds in the provinces North and South Holland and West Friesland. 2. The breeds in the provinces Groningen, Guelderland, Utrecht, and Overyssel. 3. The breeds in the provinces of Seeland. Although these breeds are closely related, still they show difference resulting from keeping and the various purposes for which they are bred.

Breeds in the Provinces North and South Holland and West Friesland.

"The breed most renowned in the kingdom for its milk-producing qualities is found in these three provinces. But North Holland in particular is noted for the manner of keeping cattle, which are known by the name of Amsterdam race, being no less remarkable on account of size than for the great production of milk. The pastures of North Holland are said to contain 100,000 morgen (158-100 morgen to an acre); every acre furnishes nourishment for 49-100 head of cattle. The peasants are engaged almost solely in cattle breeding, and the keeping and care which these animals receive here has almost become proverbial on account of its perfection.

"The cattle here are mostly spotted black and white; however, brown and blue or gray mixed are found. The height is considerable, being not under two Amsterdam ells (4 51-100 feet); the length of the body in proportion to the height, the middle part of which is particularly developed, the quarters fleshy, neck rather short than long, with a strong dewlap; head narrow and long, with the forehead slightly depressed; fine horns crooked forward, and large projecting ears. The withers are often narrow; the back, on the other hand, broad across the hips, which are not very prominent; the tail fine and long, with a good tuft of hair; the position of the hind legs strong and straight (not knock-kneed), the hind-quarters broad and roomy, and the bag well developed. The lower part of the legs above the hoofs is invariably white, which is regarded as a sign of the pure unmixed breed. The live weight of the cows is 1,200 to 1,400 pounds; that of bulls reaches 2,000 pounds when full grown and fatted. The cows are unusually productive of milk, and give an average of 3,000 quarts and over per annum.

"A very excellent milch cow of the 'Amsterdam race, from the royal cow stable in Eldena, which was brought with a few others to the International Exhibition, took the first premium for milch cows of the Netherland race at the International Exhibition of live stock at Stettin in 1865. This cow, fed in the stall only, gave in one year the great quantity of 6,142 quarts of milk, and kept up afterwards to 4,000 quarts in an equal length of time.

"To the breed of North Holland are nearly related those of South Holland and West Friesland, and differ perhaps only in that the latter are larger boned, and in general of not so pleasing a form. In regard to their milk-producing qualities they are about equal. The manner of keeping the stock, and the use of the milk, is also the same, viz.: the manufacture of cheese, while the calves are raised and sold as young stock at high prices. From these three provinces, the former two of which suffered so much lately from rinderpest, milch cows are bought for the best dairies in Germany.

"Holland cattle are well adapted to soiling, although at home they are accustomed to pasturage. They are kept profitably on the latter only when its abundance facilitates grazing and makes corporal exertion unnecessary. Therefore a great error would be made in placing these animals on a scant pasturage, and they are not at all adapted to the pasturage of a light soil. The result of stall-feeding is more favorable, because proper care and fodder can be given the stock without its exertion. We have received from no other race an equal quantity of milk with the same feed, as years of observation in the cow stable of the Academy at Eldena has shown.

"Three years ago (in 1865), different races were kept here, viz.: milch cows of Toudern and Breitenburg, in Schleswig-Holstein, of Ayrshire, in Scotland, and of Holland.

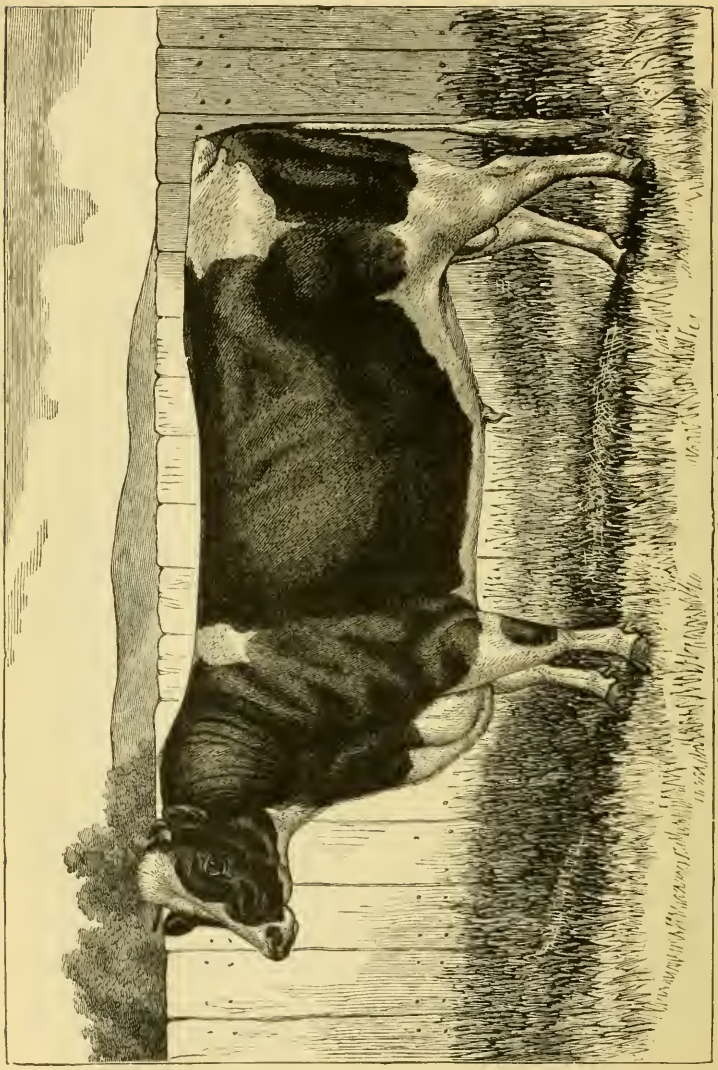
Yields of Milk.

"The yield of milk this year of these races was:

"1. Four Toudern cows gave 9,337 quarts, or an average of 2,334 quarts, or 6 3-10 quarts per day for the year. The largest milker gave 2,345 quarts, the smallest 2,020 quarts.

"2. Three Breitenburg cows gave 8,594 quarts, or an average of 2,864 2-3 quarts, or 7 85-100 quarts per day for the year. The largest milker gave 2,946 quarts, the smallest 2,820 quarts.

"3. Three Ayrshire cows gave 5,386 quarts, or an average of 1,795 1-3 quarts, or 4 92-100 quarts per day for the year. The largest milker gave 2,249 quarts, the smallest 1,415 quarts.



HOLSTEIN BULL; Age 1 year and 10 months.

"Twenty-two Holland cows gave 78,100 quarts, or an average of 3,550 quarts, or 9 73-100 quarts per day for the year. The largest milker gave 6,142 quarts, the smallest 2,526 quarts.

"The average feed per head in the Winter was daily—10 pounds Summer straw, cut fine; 2 1-2 pounds oat and wheat chaff; 25 pounds beets; 10 pounds hay; 8 pounds refuse malt from beer brewery; 3 pounds rye bran. This food is considered about equal to 12 9-10 pounds hay.

"During the Summer the cows were fed daily per head 135 pounds green fodder, viz., clover and vetches (of the latter very little was used), and three times a day 8 pounds of hay."

Feeding Qualities.

"Although there is no doubt that the Holland cows eat more, generally, than the smaller Ayrshire and Toudern (for the fodder was not weighed out for each animal separately), this is of minor importance in comparison with the greater amount of milk given by the former. The greater amount of feed consumed by the Holland cows can be estimated, viz.: Nine of them stood at one crib, while ten of the smaller stood at another of equal size; the fodder was, however, divided the same in each. The proportion is as nine to ten, or when the smaller cows eat 45 pounds of hay, the larger ones eat 50 pounds.

"From the quantity of milk given, the Holland cows used a trifle over 5 pounds weight of hay to produce one quart of milk; Breitenburg used 6 25-100 pounds of hay; Toudern 7 pounds of hay; Ayrshire 9 pounds of hay. By these results it cannot remain doubtful which race is preferable."

Early Importations Retained Pure.

"Le Roy, father and son, should not have allowed their herd to become scattered and lost as a pure breed, when they subsequently turned attention to the breeding of Short-Horns. That this was the fact is evident from the record, that at the sale of the farms of these gentlemen, afterward, none but grades were found in the herd or in the adjacent country.

"The first importation of animals that have been retained pure, were those of Mr. W. C. Chenery, near Boston, in 1861. This was a bull and four cows, which were successfully bred and kept pure. Mr. Chenery, previous to that time, in 1852, imported a single cow; in 1857 he made importations of a bull and two cows, and in 1859 a further importation of four more cows. With this latter importation he was so unfortunate as to import pleuro-pneumonia. The ravages of this dread disease extended

to the entire breed, and with the exception of a single young bull they were entirely destroyed. In 1861 Mr. Chenery made another importation of a bull and four cows, which came over sound. These and their descendants were the only pure bred herd in America for years. That they were the best representatives of their breed is certain from the fact that they were selected with care from the best dairy herds of North Holland, and were so certified to by the official authorities of the districts where they were bred."

Holsteins as Milkers.

As being interesting history and also as a means of comparison with their descendants and also with later importations, we give some interesting data:

The four year old bull girted 7 feet 10 inches. His length was 8 feet 7 inches; height 4 feet 11 inches, and his weight was 2,465 pounds. His color was jet black and clear white, the white being confined to the forehead, with a large patch on the withers and top of the rump; the limbs, brisket, belly, and flanks being also white.

In relation to yield and quality of milk, Mr. Allen says:

"The four imported cows, each seven years old, have an average weight of 1,325 pounds. The weight of a past two-year old heifer is 1,240 pounds. A past yearling heifer weighed 960 pounds; and the weight of six calves at an average of eight months, reared in the usual way, without forcing, was an average of 576 pounds each.

"The milking qualities of the breed may be judged by the following memoranda: One of the imported cows, when six years old, dropped a calf on the 15th of May, weighing 101 pounds; and from the 26th of May to the 26th of July, by a careful and exact record, gave 4,018 pounds 14 ounces of milk. The largest yield in any one day was 76 pounds 5 ounces (35 1-3 quarts). In ten days, she gave 744 pounds 12 ounces, or an average of 74 47-100 pounds per day. She gave a good flow of milk during the season, continuing to the 24th of May following, and on the succeeding day dropped twin heifer calves, which weighed 155 pounds. The amount of cream produced from this cow's milk, in a vessel specially prepared for measuring it, produced 22 70-100 per cent of the milk, as tested by an accurate examination.

"The nutritive qualities of the milk were also tested by a thorough chemical analysis, and found to be excellent. It is also rich in its caseine, or cheese-making properties. Six days' milk of this cow was set for cream, and the produce was 17 pounds 14 ounces of good butter—nearly 3 pounds per day; and it is claimed by the owner that she is *not* the *very best* cow of the herd.

"These results show not only the remarkable productions of the cow, but the accurate and pains-taking care of the proprietor of the herd in testing their ability at the pail. Of what the food given to the cow was composed, we are not informed. We are to presume, however, that it was of the best, as every cow should have, to test to the utmost her lacteal faculties."

Weights and Milk Products.

The Holstein bulls weigh from 2,000 to 3,000 pounds, and are kind, tractable, good tempered. A half-blood Holstein steer is recorded that weighed 19,000 pounds, and some two-year olds that averaged 1,300 pounds.

In a large number of tests that have been made with Holsteins and natives at various factories in the West, the results reported showing as follows: Natives range from 5,000 to 8,000 per year; Holsteins, from 8,000 to 12,000 lbs. per year of milk.

In a comparison of Holstein and Ayrshires, the following is the report of three herds of Ayrshires, including Dr. E. L. Sturtevant's herd. The Dr. gives the record as follows: General average with 13 Ayrshires for four years, 5,543 lbs. The best year was 1872—13 Ayrshire cows (no heifers), 6, 047 lbs. Mr. E. F. Miles, of Massachusetts, gives the following yield of Ayrshires: Best year's average out of five years was 6,292 lbs., from a dairy of 11 cows; general average for five years, 5,614 lbs. Mr. F. H. Appleton, of Massachusetts, gives the following record of three Ayrshire cows for one year, average, 7,055 lbs.

It is quite safe to say that these cattle will give from 8,000 pounds up to 12,000 pounds a year. Mr. Hubble, of Onarga, Ill., gives the record of one cow, which gave 14,000 pounds in less than one year, and another which, in 1878, gave 15,960 1-8 pounds of milk.

Herd Records.

As showing the great value of any pure breed in the production of milk. Keeping in mind always that the Jerseys give exceptionally good milk, and the Ayrshire and Short-Horns the next in richness, we append a list of herds for a series of years, showing the number milked, the average yielded per cow and the average of all given breeds, which is tabulated on next page.

As milking cows the Holsteins are wonderful, as cheese-makers they are superior, as butter-makers they do not stand the test so well. In fact, Holstein breeders always tell how much milk their cows will give; the Ayrshire men, how much milk, and butter, and cheese their cows will

AYRSHIRE HERDS.

No. of Years.	No. of Yields.	Herds.	Average Yield per Cow.
11	109	Waushakum	5,229 lbs.
5	44	Cherry Brook	5,372 "
2	16	Roadside	5,334 "
1	4	Cushing's	5,705 "
5	57	Maplewood	5,583 "
3	18	New Jersey Agricultural College	6,534 "
4	38	Cochichewick	5,571 "
2	12	A. Lebby's	7,582 "
1	37	Oneida Community	5,498 "
1	8	Cornell's	6,405 "
		Average of all	5,881 3-10 "

HOLSTEIN HERDS.

3	7	Togus	5,922 "
1	5	Oneida Community	8,771 "
3	11	Miller's	8,590 "
		Average of all	7,761 "
		[Let us add to these two well-known herds].	
4	24	Col. H. C. Hoffman's	9,369 "
1	9	Unadilla Valley Association	8,384 "
		Average of all	8,876 1-2 "

JERSEY HERDS.

2	17	Togus	4,128 "
3	8	E. P. of Rhode Island	4,622 "
3	80	Deerfoot	4,658 "
1	4	Nordheim	3,808 "
1	14	Hillsdale	4,269 "
		Average of all	4,303 "
		Let us add to this list the	

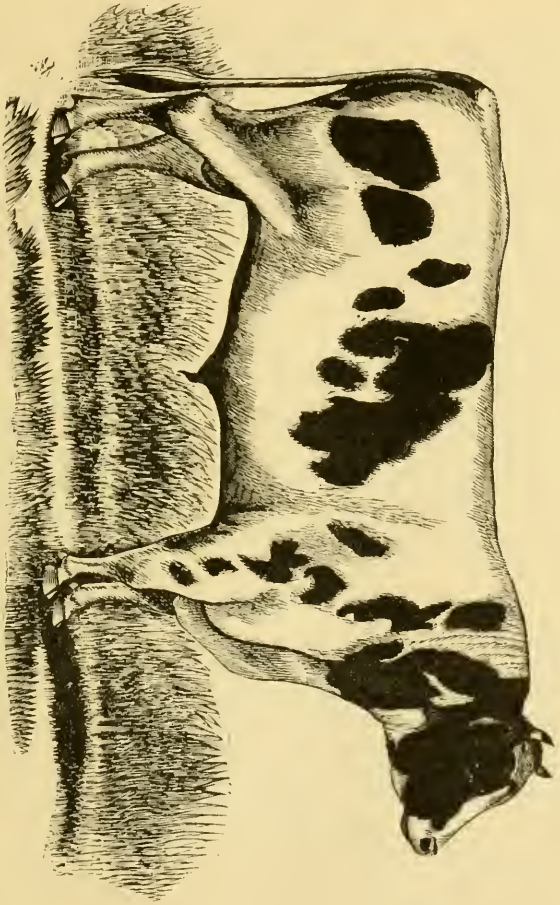
SHORT-HORN HERDS.

1	55	R. Ashburner, California	6,870 "
3	60	Harris Lewis	6,400 "
1	74	John Lea, Eng., 500 lbs cheese in 8 mos., and milk for calves—milk sold in winter	
7	35	Beauchamp's C'rt, Eng (These were samples of a large herd).	8,000 "
		Average of all	6,736 "

make; the Jersey owners, how much butter and cream to the quart of milk. To show that the Holstein is not a butter cow, the following deduced from a table published by the London Agriculture Journal, the results of tests made by Mr. Amersfoordt, of Badhoeve, in the Lake of Haarlem, Holland, a most competent authority, who tested the milk of 46 cows in June, and 49 cows in November, with Prof. Tesser's lactoscope, which is claimed to give a close approximation to the actual fat in the milk.

In the table made by Mr. Amersfoordt, the yield of each cow on the 15th of June and the 24th of November is given with the per centage of fat. The average yield of 46 cows in June, is 13.87 litres, or 31 lbs. each, and the per centage of fat 5.217. Six of the largest milkers gave 20.2 litres, or 46 lbs. per day, with 5.2 per cent. of fat.

On the 26th of November, 49 cows gave an average of 6.24 litres, or 13.92 lbs., with 6.32 per cent. of fat. The largest per centage of fat was 7.50. If the lactometer of Dr. Fesser is accurate, this would show



HOLSTEIN BULL, of the Chenery milking stock.

the Holsteins to give milk as rich as our native cows, whose milk will yield 5 per cent. of butter on flush grass in June, and 7 per cent. in

November. So considering the noble milking powers of this breed, and their well-known ability as cheese-makers, their outcome in butter should be considered satisfactory.

The Kerry Cow.

In Ireland, from time immemorial, there has existed two distinct races of cattle that were valuable in their day and time; one a long-horned breed, and the other belonging to the middle-horns and considered an aboriginal breed. Of the long-horns we have already made what mention is necessary here, except that we may add that from their resemblance to the English long-horns, they have been supposed to have had the same origin; but whether the English family came from Ireland, or *vice versa*, is not known; history is silent on the subject, and it matters but little to this generation. The middle-horns and the short-horns are the valuable cattle of the present day, and they will be the cattle of the future.

The other representative branch of the *genus Bos* in Ireland, the cattle of Kerry, or as they are now termed, Kerry cattle, are worth more than a passing mention, because there have been representative animals imported to the United States, and they may have value in some mountainous countries of the United States, and the far Northwest, for their extreme hardiness, their facility in shifting for themselves, and their adaptability in fattening when not in milk. As a breed they are rare, and even in the last century were not to be found except inland on the mountains. They are described by Youatt as small, light, active and wild.

The Kerry at Home.

The head is small, although there are exceptions to this in various parts; and so numerous, indeed, are these exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short, as compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; they are black-brindled, black, or brindled, with white faces. Some are finer in the bone, and finer in the neck, with a good eye and sharp muzzle, and great activity.

They are exceedingly hardy; they live through the winter and sometimes fatten on their native mountains and moors; and when removed to a better climate and soil they fatten with all the rapidity of the aboriginal

cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent.

The cow of Kerry is truly a poor man's cow, living everywhere hardy, yielding (for her size) an abundance of milk of a good quality, and fattening rapidly when required.

These cattle usually are small, and are confined to the hilly and moor grounds. Some are of considerably size, elsewhere, and are improved in form as well as weight. The horns, usually of middle length, turn up, as do the horns of those on the mountains; they are shorter in the leg, shorter in the body; their loins and haunches are heavy and wide; although the hair is thick, the hide is mellow, and they thrive with rapidity. This is as they were known many years ago. They have since been bred with care. The London *Stock Journal* of a late date says of them now: "These characteristic points of the breed are unmistakably well marked. The size is small. The legs in most cases are very short in proportion to the size of the body. The head is somewhat small, though the muzzle is long and clean. The lips are thin; the expression of the countenance is pleasing, and the eye is particularly clear and fairly prominent. A symptom which is most indicative of purity of breed is the "turn up" of the horn, which is of medium length. Occasionally, however, the horn will, after turning up, turn backwards. The nicety of the horn and the manner in which it is set on adds immensely to the style. The neck is not massive at the junction with the head, but it thickens gradually, and affords reasonable covering to the shoulders. The latter are flat and thin. The dorsal vertebræ rise more than in other cattle, which sometimes gives the back an irregular appearance. The ribs spring well, especially the last of those approaching the hip: this makes the body very compact. The loins are of medium width, and the hip not prominent. The distance between the hip and the setting on of the tail is not considerable: the latter hangs neatly, and is well concealed by the adjoining bones. The chest is full and deep, and the hind-quarters long, but rather light. The favorite color is black, though black and white, brown, and red, are by no means uncommon. The coat is invariably fine and thick, and the hide elastic and mellow, showing great capacity for the production of flesh and fat.

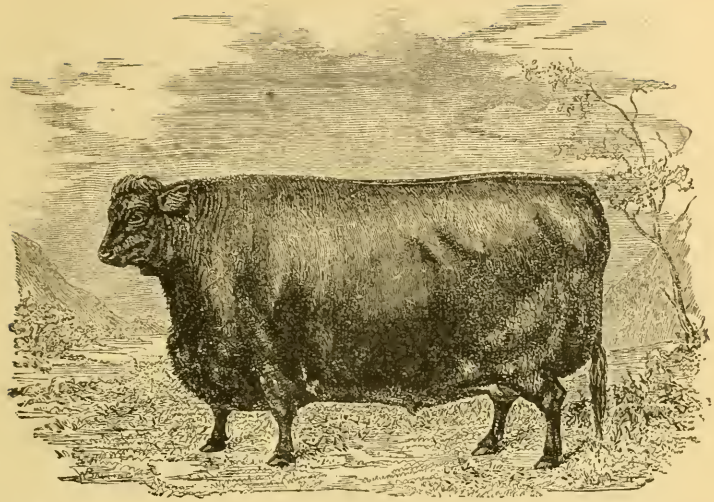
"Sixteen quarts of milk per day may be regarded as the maximum quantity the best specimens of the breed will give, and twelve quarts may be regarded as a good average for the entire season. This is, of course, on good keep. The milk is rich in cream, and the butter delicate in flavor, superior in color, and, as in the case with the Jersey cows, one or two Kerries will give the milk of ten to fifteen other cows in the production of butter. As an indication of the richness of milk of the Kerry cow, eight to nine quarts are said to produce a pound of butter."

In relation to their adaptability to fatten, it is said to be a remarkable peculiarity of the breed, but they take a long time to mature. At three to four years of age they will not dress more than three to four hundred pounds of beef to the fore quarters. They are not however beef cattle, nor are they adapted, in this country, to dairying, except by mixing, to improve the messes. In fattening, however, when of mature age, they thrive most rapidly, and the beef in point of being well marbled, in flavor, and tenderness, is not excelled by that of any other breed.

With proper care and breeding, there would seem to be capabilities in this breed well worth perpetuating and improving, especially now that dairying as a distinctive branch of agriculture is assuming such proportions in the United States, and particularly in the West.

In relation to constitution, hardiness, etc., the authority last quoted says: "It is already observed, the hardy constitution of the Kerry most enhances its value; for dairy purposes especially a remunerative yield is obtained on what would be to other animals 'starvation fare.' In the depth of the winter season I have not only known the animals to live jumping from rock to rock, and from cliff to cliff, picking a coarse scanty bite from among the mountains, but with very small additional keep at the farmsteading, whither they come to be milked morning and evening, to actually thrive under the circumstances. Few people think of housing the Kerry, either night or day, at any period of the year. When not giving any milk they remain for months away concealed in the ravines of mountain passes, seeking the best shelter they can from the excessive rain and snow storms with which their abodes are periodically visited. The hair is thick but fine and long—a provision of nature typical of cold latitudes.

"What, however, is far more singular in the constitution of the breed, is the readiness with which it adapts itself to circumstances of a wholly reverse character. In acclimating breeds of cattle, sheep, or pigs, the transition must be gradual; but with the Kerry we have it suddenly and indiscriminately transferred from its home in the mountains to the richest grazing valleys which our island can boast of without experiencing the slightest change in regard to health. Not alone this, but we have seen the beasts ushered at once into the dairy sheds, and there confined for years, in the closest bondage, without any apparent effect on the constitution. They further enjoyed the full benefit of the change as well as if the new abode was their native habitation. It was for a time believed that the frame of the breed was impregnable to pleuro-pneumonia, or other contagious diseases. Recent experiments which have been conducted have failed to establish this view."



POLLED ANGUS COW.

Polled Cattle.

Of the Polled breeds of cattle in England there are several. Only one of these will be considered here as being of value in the United States. Among the polled breeds that have acquired reputation are the Angus Polled, the Suffolk and the Galloway. The latter have been of late years brought to the United States, bred and exhibited at our fairs. Those specimens we have seen have proved to be most admirable cattle, thick-meated, deep-flanked, short-legged, fine-haired animals. That they were considered most valuable cattle, and worthy of being brought here in the early settlement of the country, is evident from the fact that forty years ago these hornless or muley cattle, as they were termed, were not extremely rare, often breeding back by reversion entirely hornless or with but the rudiments of horns, as gentle and good milking cattle. Gentleness is a characteristic of the pure Galloway. Even the bulls are noted for their docility and quiet tempers. For the reason that this breed of cattle have of late years been growing in favor in the West as grazing and milking cattle, and for the further reason that it is thought that crossing the Galloway on the half-wild Texan will be most valuable, we append the following general characteristics of the breed.

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump; are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins, and broad in the loin, without any large projecting hook-bones. In roundness of barrel and fullness of ribs they will compare with any breed, and also in the proportion which the loins bear to the hook-bones or protuberances of the ribs. When viewed from above the whole body appears beautifully rounded, like the longitudinal section of a roller. They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. There is less space between the hook or hip-bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in an animal being well-ribbed home, or as little space as possible lost in the flank.

The Galloway is short in the leg, and moderately fine in the flank-bones—the happy medium preserved in the leg, which secures hardihood and disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest and close, compact form of the breed. The neck of the Galloway bull is thick almost to a fault. The head is rather heavy; the eyes are not prominent; and the ears are large, rough and full of long hairs on the inside.

The Galloway is covered with a loose mellow skin of medium thickness, which is clothed with long, soft, silky hair; the skin is thinner than that of the Leicestershire, but not so fine as the hide of the Short-Horn, although it handles soft and kindly.

The prevailing and fashionable color is black; a few are of a dark brindle brown, and still fewer are speckled with white spots, and some of them are of a dun color. Dark colors are uniformly preferred, from the belief that they indicate hardiness of constitution.

The Galloway cows are not good milkers; but although the quantity of milk is not great, it is rich in quality, and yields a large proportion of butter. A cow that gives from twelve to sixteen quarts per day is considered very superior, and that quantity produces more than a pound and a half of butter. The average, however, of a Galloway cow cannot be reckoned at more than six or eight quarts per day, during the five summer months, after feeding her calf. During the next five months she does not give more than half that quantity, and for two or three months she is dry. There is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement

by any foreign cross, than the Galloways. The Short-Horns almost everywhere else have improved the cattle of the districts to which they have traveled; at least in the first cross produced manifest improvement; but even in the first cross the Short-Horns have done little good in the Galloway, and, as a permanent mixture, the choicest southern bulls have failed. The intelligent Galloway breeder is now perfectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection. While this is undoubtedly true of all pure or thorough-bred stock, it seems especially so of the Galloways to-day. It does not however follow that pure breeds may not improve the mixed stock of a country. They must and do, as the magnificent Short-Horn, Hereford and Devon grades amply testify in all our great markets. That the Galloways have many valuable points cannot be denied. One of these is their absence of horns; another is their extreme docility. If by crossing Galloway bulls with Texan cows their horns could be toned down their wildness tamed, their frames thickened with superior flesh, their milking qualities improved, and the whole animal ameliorated, it would seem as possible with the Galloway as by any other means we know. It is certainly well worthy of trial.

Texas Cattle.

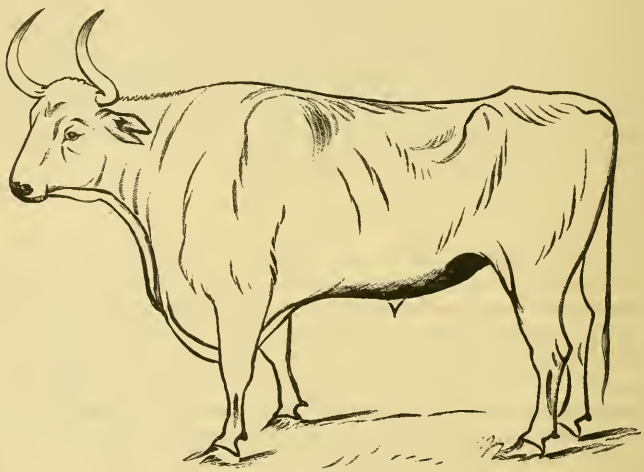
Within the last few years certain theorists have harbored the idea that the immense herds that cover the great plains of Texas, Mexico, and America are a race native to the soil, and that have existed there from time immemorial. Such however is well known not to be the fact. As well may the great droves of horses that occupy the same region be said to be a native and wild race. On the contrary, their well known characteristics, and similarity to the Spanish cattle and all that country including Austria, Hungary, and other regions bordering the Mediterranean, Black and Caspian seas, points distinctly to their origin, if, indeed, it were not well known that they were introduced by the Spanish settlers about the year 1500 and succeeding years. In fact, neither cattle or horses were known in America prior to the Spanish invasion, and that they have multiplied so amazingly since is due to the genial climate and abundant pasturage, so that the original cattle brought by the Spaniards succeeding the discovery of the various countries along the Gulf of Mexico and South America, has caused them to spread over all the region from California to a latitude south, bound only by a line beyond which the coldness of the climate precluded constant Winter and Summer herbage.

Unlike the wild buffalo, a race indigenous to America, cattle are not migratory to any considerable extent. Not so much so as horses. Hence

while the buffalo is found in Summer far north, even into the British possessions, cattle have never been found beyond the limits of abundant Summer and Winter pasturage, and they have never been brought into subjection by the wild Indians of the plains as were the horses, that escaping from domestication gradually increased and occupied in a wild state many valleys to which cattle never reached.

Characteristics of Spanish Cattle.

This race of cattle should therefore be called Spanish cattle—what they really are; gaunt, bony, long-horned cattle, semi-wild, capable of great endurance of heat, and adapted to the dry but fertile regions they



A TEXAS STEER.

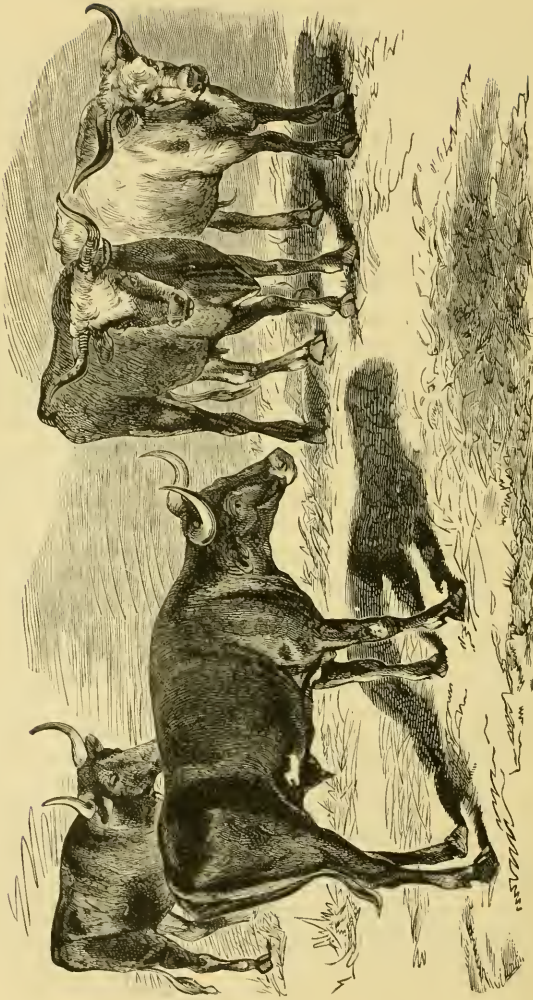
have gradually overrun. So vast has become their numbers that ten years ago these cattle were estimated at 4,000,000 in Texas and New Mexico, being in point of numbers about one-seventh of all the horned cattle in the Union. Semi-wild, impatient of restraint, lean and lank in body, high-boned, furnishing but little meat, and that of an inferior quality, giving little more milk than wild buffalo—scarcely enough for a few months Summer support of a calf—they were for generations run down like wild beasts and slaughtered for their hides and scanty tallow. The gradual settlement of the country, and the increasing demand for beef, both in Europe and America, at length caused them to be moved

north into Kansas for summer pasturage, whence they were driven to the nearest railway station, shipped east and slaughtered, either for packing, or sold at an inferior price for consumption of flesh.

Various attempts have been made to reduce them to subjection to man so they might be divided into small herds to be confined in pastures or fed in winter. It has been in every instance unsuccessful. They remain shy, wild, irritable, and refuse to fatten kindly. The writer, immediately after the close of the war, having a large quantity of forage and fattening material, with mills for grinding corn, and stables for the accommodation of 450 cattle, on account of scarcity of stock was obliged to put in Texans.

Feeding Texans in Confinement.

They were bought in Kansas and were known as Cherokee cattle, a modified form of Texans, bred by the civilized tribes of the Indian reservations occupying the territory between Kansas and Texas. They had to be lassoed and dragged into the stables and made fast to the stanchions, from which they could not be allowed to escape until turned off in the Spring. Underground pipes conveyed their drinking water, the feed, ground corn and hay, together with residuum from a mill was conveyed to them by cars on tramways running between each two lines of cattle. The stables were kept only light enough so that the workmen could see to feed and clean; good ventilation was provided, and at the end of six months they were turned out, and shipped to New York,—good ripe cattle so far as Texans could be made such,—and brought the price of fat cattle in the market there. Of this lot only two car-loads were culls or unfit for the New York market. They were strictly corn-fed, or rather meal-fed. For the first month they were sulky and savage, refusing to take kindly to their rations. They never became so quiet that strangers could be allowed in the barns without danger of throwing them off their feed, and yet they were altogether superior to the ordinary Texan cattle of ten years ago in point of docility, for they had been closely herded. Nevertheless, the one experiment was sufficient. If other cattle could have been had at a fair price it would not have paid to have fed them. At that time good cattle were high and scarce, Texans were cheap. The ledger account came out all right in the Spring, but the writer did not care to try the experiment a second time. As to how they looked when off of grass and ready for the stable in the Fall, the full page illustration we have prepared will show:



MODIFIED TEXANS, OR CHEROKEE CATTLE.

Weight of Texan Cattle.

The average weight of full grown Texan steers as usually sold from grass in the Western markets, may be stated at 1,000 pounds; of this the average beef and bone will be 400 to 450 pounds: of the balance, except the hide, it is pretty much offal, the tallow being exceeding light. Of late years very many Texas cattle are yearly bought for feeding in distillery stables, on the slop made in the manufacture of high wines. They are roped and fastened and remain there until sold to the butcher. Others again are bought in the Autumn and shipped to the vast corn-fields of Kansas, Iowa and Illinois, and fed in the fields during the Winter. They really take more kindly to this latter system of feeding than any other, and they will gain about two hundred pounds of flesh during the Winter, weighing an average of 1,200 pounds, and making in the neighborhood of 700 pounds of beef.

From what we have stated it will readily be seen that there is no profit in breeding Texans, when other cattle may be kept. There are, however, vast outlying territories where the herding of these cattle is found profitable. In Texas, New Mexico, the Indian Territory, Western Kansas and Nebraska and Dakota, in the valleys of Montana and Wyoming, they may have unlimited range, and enjoy their semi-wild condition, and fattened on grass may be shipped east to be slaughtered and barreled for export, or fattened as we have previously stated. Of late years enterprising herdsmen have bought great quantities of Short-Horn and Hereford bulls to be used in the improvement of their stock. The effects are already apparent. It is well understood now that the produce of either of the bulls we have mentioned, in the first cross, produce an animal much superior to the dam, and which will sell at three or four years old for nearly double what the natives will. The cows give a largely increased quantity of milk, they make better and fatter calves; and here again is a conclusive illustration to the breeders of cattle everywhere, of the utility of improved breeds in inducing early maturity, increasing the weight and improving the quality of the beef.

Profits in Breeding Grades from Texans.

Within the last ten years fortunes have been made in herding Texas cattle, not only in that State, but in various Territories of the United States. There are two essential requisites; plenty of good grass for Summer and Winter pasturage, and abundance of water. The latter is *the* essential. Many persons have failed in their efforts to profitably breed Texas cattle on the plains, for the reason, that water was either not near, or insufficient in supply. The cattle must go long distances to slake their

thirst, and consequently become very dry and uncomfortable before starting to the watering place. Then they drink such immoderate quantities of water, as again to be uncomfortable for some time, and will, if allowed, hang about the water, on scant grass, until again forced to take the range. Thus they cannot gain in flesh uniformly, but on the other hand, absolutely lose condition in the constant travel necessary to get water. Perhaps some epidemic sets in, and they die by hundreds, and the owner finds himself the loser, simply from entering into a business hastily, and without studying carefully the absolute necessities in the case.

There is another class of failures. These have been persons who have supposed they could take fifty cows, and make money by herding them until grown up. In all that wild region inhabited by Indians more or less predatory, the force about a ranch must be strong enough for some protection. The profits must come principally from the increase in cattle. If the small herder has water privileges, he can make money if he has stock enough. If he has but few, the expense of herding will be the same as when the herd is larger. Owners of other and large herds, or those seeking to become such, will not take kindly to the appropriation of water privileges, for so small a drove. There will be quarrels; cattle will be stampeded, and get mixed with other herds, and at last the owner will be obliged either to leave, or take a partner with sufficient capital to properly stock the ranch.

The yearly increase in value of cattle on the ranch will be all the way from 25 to 50 per cent. according as the business is managed. In northwest Texas the value of cattle on the ranch is for yearlings $6; two year old $10; three year old $13; cows $12 to $15; beeves $15 to $20.

The Cattle Interest of Texas.

To give some idea of the vast numbers of cattle in all that region where there is abundant pasturage and water, it has been estimated that, from the Red River, in Clay county, west to the Pease River, and south to the Colorado, embracing a territory of perhaps twenty-five thousand miles, the whole region is now stocked to its fullest capacity, and in the better portions thereof, it is estimated that an average of one head may be kept to eight acres. The loss in cattle may be estimated at about four or five per cent. per year, and the expense of herding 300 head and their produce, has been given as follows:

DR.	
To three hundred cows and calves	$ 3,000
To two imported bulls, $125	250
To one man's time and boar 1 for five years, $300 per year	1,500
To one man's time and board for three years, $300 per year	900
To sundry items of expense	350
Total	$ 6,000

CR.	
By three hundred five year olds, $18	$ 5,400
By three hundred four year olds $15	4,500
By three hundred three year olds, $12	3,600
By three hundred two year olds, $10	3,000
By three hundred one year olds, $6	1,800
By three hundred old cows, $10	3,000
By two bulls, $100	200
Total	$21,500
Less loss 25 per cent	5,300
	$16,200
Original investment	6,000
Profit in five years	$10,200

This is approximately correct, except as to the value of the bulls, if by these are meant acclimated thorough-bred bulls of Short-Horn, Hereford, or Galloway blood. It is well known that it is useless to take mature bulls or other cattle raised in the North, to Texas. They die off with Texas fever before they have time to leave their impress to any considerable extent. An acclimated bull two years old past, should be worth $250. Not less than three such bulls should be used in the herd of 300 cows. The second year 150 heifers will be in breeding condition, and the increase will then be increasingly fast. The fourth year two more bulls must be bought, and at the end of the five years, the three first bulls will be practically of little value. With these exceptions, the figures may be taken as correct.

Acclimating Improved Bulls.

The serious losses that have constantly occurred from the death of thorough-bred bulls sent to Texas for the purpose of infusion of blood has prevented, to a great extent, the improvement of the stock. In all the plains regions of the West this difficulty has not been so severely felt. The improved breeds take kindly to the Summer climate and only require protection in Winter, and if put with a herd in which the germs of Texas fever have been eliminated are healthy. Not so those taken to Texas. Whatever the cause of the disease, it is certain that nearly every animal taken there has succumbed to this dread disorder, if placed immediately in the herd, and generally before they have had time to

serve more than from twenty to forty cows, and from weakened condition the impress they have left has been deficient in vigor to that of either the sires or dams.

Select Your Bulls.

To obviate this a thorough system of acclimation must be established. And above all none but very young animals should be taken. In every case they should be calves of early Spring, bought when they are eight months old. The cars in which they are carried should be carefully prepared, to provide for the comfort of the animals. Pay particular attention to feeding and watering regularly so as to keep the bulls vigorous and strong.

Buy none but animals of parents and families of known soundness and vigor of constitution. Avoid all fancy or highly in-bred families. Abjure excessive style and fineness, and look only to the single points, *constitutional soundness and vigor, and thick beef.* It is better that they be a little rough from having been bred out of doors, and with out-of-door care, rather than stable bred, pampered animals. Such are not even fit to put with the breeding herds of the plains. To carry them to the very home of Spanish, or as it is now called Texas fever, can only result in loss. When they arrive establish them in good, well ventilated stables, and under the supervision of a keeper who fully understands both breeding and raising, and do not allow them to mingle with the native cattle until they are at least two years old; and, no contact should be allowed with stock that are known to show indications of the malady. One more suggestion: the bulls should not be freely used as breeders until they are twenty months old. In acclimating the bulls, watch for the first symptoms of the fever, and give prompt treatment at the first discovery of the disease. This may be known by the restlessness of the animal. The eyes will be dull, the movements constrained and moping, there will be more or less straining in the attempt to urinate; that voided will be scanty, high colored, and of bad odor; and the bowels may be costive or very much relaxed. Treatment, said to be most successful, is to give at the first indication of the disease one tablespoonful of finely pounded charcoal, and one teaspoonful of ground ginger, to be followed in an hour with a quart of strong decoction of marsh mallow, and one quart of camomile tea. This to be repeated in ten hours if the animal does not get relief. If marsh mallow can not be obtained, salt peter is recommended. This remedy, however, had better be given under the direction of a veterinary surgeon. Above all, endeavor to keep the pores of the skin active by

brushing and friction. By proper care in this direction it is stated that ninety per cent. of the cases treated can be saved.

In all this, care of course must be taken in regard to the food of the animal. Bran, boiled oats, and corn, or corn meal, may be given; if roots, carrots, parsnips, or sugar beets can be had they will be excellent. In fact they should always be kept in supply on breeding farms. Grass in plenty and of good quality should also be supplied freely.

A Texan's View.

An intelligent and educated correspondent of the *Live Stock Journal*, gives the following excellent advice in relation to the transportation, care, and feeding of stock bulls to be carried to Western Texas. He advises that care should be used in the selection of calves of stout, robust frames, the offspring of sires and dams of good constitutions. Calves dropped in the early Spring will be found most suitable for shipment say about the last of November or early in December. Plenty of milk from birth until September should be given them; then they should be fed on wheat bran, boiled oats, and crushed corn, until date of shipment; and if kept in stables during the day they should have a good grass lot to graze in during the night. They should be handled, made very gentle, and well broken to the halter. The cars for transportation should be well bedded, and food for the entire trip transported with the stock.

Arrangements should also be made for through trip when starting. Food, water, and careful watching by the herdsmen will land them at the place of disembarkation but little damaged by the trip. Care should be taken not to crowd too many in one car—thirty head can be taken if they are properly cared for—yet twenty-five head would do much better. The calves designed for shipment in one car, if more than one is to be sent, should be permitted to run together for some time previous to starting. After reaching the terminus of their journey by rail, a week's rest, in dry lots, should be granted them, with the same kind of food as before shipment. When taken any distance slow and easy travel should be given them. If either costiveness or its opposite is exhibited, simple remedies should be given to prevent the too active purging or relieve the constipation. The preparation for their reception at their Texas home should have been completed before their arrival; and in addition to a supply of corn, oats, and wheat bran, pure running water and free access to a growing oats or barley patch, which should have been sowed in early Autumn for their benefit, should be allowed. Suitable protection must be provided to guard them from the cold blasts of the "northers;" then, by prompt attention to any symptoms of fever and the immediate use of

charcoal and ginger, one table-spoonful of charcoal and one tea-spoonful of ginger will relieve them.

If December and January are passed without fever you can feel safe from its ravages until the rains of Spring, followed by the heat of June, when the *ticks* and *vermin* menace them. Then avoid exposing them to either rain or sun, and destroy the vermin by a free use of coal oil and lard, using two parts of the latter to one of the former. If only Spring calves are brought there will be less of fever than if older animals were brought. Too many who bring young stock to Texas stint and half starve them, thinking that to keep them in good growing condition increases the chances of disease. My observation teaches the reverse to be true. To secure a complete development of bone, flesh and growth, and early, profitable maturity, a calf must have generous care, plenty of nutritious food, good water, and kind treatment. I have heard men complain that Texas Short-Horns are not thrifty and handsome, like those exhibited at Northern fairs. The reason for the dissimilarity is readily found on investigation to be that the one had excellent feeding and growing, while the other—in addition to a long winter, starvation, and acclimation, with a Spring and Summer with rain and hot sun—had his vitality almost destroyed by *ticks* and *vermin*. Cattle from the North cannot be acclimated unless generous food, comfortable quarters, and kind treatment are given to them during their first year in Texas; and unless this treatment be kept up they are worthless when acclimated.

CHAPTER II.

BREEDING AND FEEDING.

In the breeding of animals, one must have a definite object in view. We have already stated that in this age of civilization, where industry is divided and subdivided, so that each set of workmen have separate and distinct lines of labor in the make up and finish of the most simple articles, so in stock breeding, the farmer must understand the nature and adaptation of his soil, and its adaptability to certain crops and animals. In rocky, hilly, and comparatively barren regions, or where the soil suffers under drought, the farmer cannot compete, either in the raising of beef cattle, or in dairying, with the more favored well matured countries of deep soils and flush pastures. Again, in a country noted for its short, sweet perennial pastures, and cold springs of water, the stock breeder cannot compete with the dairyman. The stock feeder of cattle and hogs must be in a region where corn, or other feeding grains can be cheaply and abundantly raised. Fortunately, such countries are well adapted to the meadow grasses, producing heavy crops of hay and pasture.

About Grasses.

Here again, the grasses cultivated will be somewhat different. The stock feeder will depend chiefly upon blue grass, timothy, red top, orchard grass, and clover, and where blue grass is natural to the soil, he will depend almost solely upon this grass, for late fall and winter feeding, as he will upon blue grass and orchard grass for spring feeding, depending later on clover, timothy and red top. The dairyman, while he will depend upon clover, timothy, red top and orchard grass for hay, will not use these for pasture exclusively. He must have in his permanent pastures a great

variety of grasses. His pastures, to produce the greater quantity and best quality of milk, must be permanent ones, and the older the better. This with a moist climate is what has made some sections of England, and especially Ireland, Holland, and Denmark so celebrated for their dairy products. This, also, with the peculiar care given in feeding, has made England and Scotland celebrated throughout the world, not only for the heavy weight, and superior quality of the beef, but it has resulted in such superior beef cattle as the world has never before known. Some of these breeds, transplanted to the United States, have taken kindly to our soil and climate. The wonderful fertility of the land lying west of the Alleghanies and north of the southern line of Tennessee, and especially those States bordering upon the Mississippi and Missouri rivers, and principal tributaries, and, also, the great Southwest — this teeming fertility of soil has made all this great region of country the true home of the most celebrated breeds of cattle—where they have reached weight, and richness of milk given, no where else attained except in very confined areas.

What Breeds are Best?

This becomes a most important question. In all that great region of the West, of gentle undulating prairies or grassy plains, Short-Horns and Herefords will be found the very best cattle to breed from, when only beef is the object. If labor and beef are wanted, the Devons and Herefords will be found most valuable. If beef and milk are to be the products, the Duchess and Princess families of Short-Horns, and the Holsteins will give the best returns. If dairying is to be the chief industry, then, for butter, the Ayrshire, with a few of Jerseys intermixed will produce the best results. If for butter and cheese, Ayrshire or Short-Horns. If cheese alone, the Holstein, and for quantity of milk given this latter breed will certainly carry the palm. If milk and butter, without reference to quantity, be required, the Jersey is the cow. All the breeds except the Jerseys will make good weights of beef and fatten readily when dry — the Short-Horns, Holsteins, and Ayrshires making weight in the order named. For milk, we have not included the Devons; occasionally a cow will be found giving a large mess for her weight. Devons, however, are not dairy cows, at least, now-a-days; having been bred most exclusively for their superior quality of marbled beef, and their uniform excellence, courage, and kindliness in the yoke.

How to Breed.

All farmers cannot become breeders of highly bred, pure stock. For this the animals must be isolated from all other breeds of the same race.

At least the males must be strictly confined, so they may not intermix with others. Where farms join, divided only by fences, this will not be found practicable in a majority of cases. One's neighbor may fancy scrub stock. They are notoriously breachy. Once they intermingle with a pure breed, the taint of their blood is not only found in the calves, but in the dams themselves. In the calves and their progeny, it may never be bred out. We see the Kyloe cross in some families of Short-Horns, even to this day, cropping out in single individuals after a lapse of nearly a century. The writer so saw it at the last fat-stock show in Chicago—that of 1879. The animal was a most excellent specimen; fully as perfect as many of the very highest breeding, yet the taint of the family was there and the breeder of "high caste Short-Horns" would not have bred from such a cow or to a bull showing the taint, at any price.

About General Utility.

Just here is where the difference comes in, as between breeding for general utility or absolute purity of blood. The breeder for general utility cares not so much about a particular strain of blood, as he does to get certain characteristics that will furnish him, at the least expense, either the most beef, the best working oxen, or the most and the best milk. Those who undertake breeding, or in fact any other business, in a haphazard way, always fail; the only exception to the rule being pure luck. Luck is not a good business integer to depend upon. Like lightning, it never strikes twice in the same place.

There is another thing in connection with luck that it is well to bear in mind. It is as apt to mar as to mark. The farmer, therefore, who undertakes the breeding of stock, with a view to the money they will bring from the butcher, or from the sale of dairy products, must be guided by an entirely different set of rules from that of the breeder who breeds solely with a view to selling sires and dams to other breeders of pure stock. So particular, now-a-days, have breeders of this class become that some of them will breed only particular families. Some will not allow a Booth cross, others abstain from the Bates blood.

Many high caste breeders are pretty well agreed that a top cross of what are known as seventeens, and some other sub-families of later importations, and also of particular bulls of pure breeding, but which have been considered more or less coarse, must be rigidly excluded. They have their particular fancies. To gratify this fancy they will pay extraordinary prices, while the great mass of really superior and really pure Short-Horns will be passed unnoticed. It would be unadvisable for the ordinary farmer, or even the Short-Horn breeder to buy these

"terribly bred cattle." And the farmer must carefully discriminate. Let him get staunch healthy cattle to start his herd, if beef be the object, and animals with good milk points if milk be the object, rather than to strive for color. So long as the color of the animal is characteristic of the race, the beef points and the milk points are what he should seek. The body in the beef animal, and the udder in the dairy cow, is what he wants.

Breeding in Line.

Breeders of pure stock are especially particular in the selection of sires; so much so that many of them breed solely with reference to the strain of blood particular families contain, the selection often being without reference to the uniformity or quality of the animals selected. Really, however, breeding in line means the selection of males of a common type, and belonging to the same family. Thus in breeding in-the-line, the expert, while he objects to going out of a sub-family, nevertheless seeks to couple animals together whose uniformity is identical, or, when one is weak in some essential, to improve it by coupling therewith an animal of superior excellence in this particular. Thus, if the head and horns be rather coarse in an animal, it is bred to one fine in head and horns, but not lacking in other essentials. It is one of the most fatal mistakes that can possibly be made in breeding, that to acquire one essential other disabilities be allowed to enter. Many breeders have committed irreparable injury to their stock by not understanding the necessity, while trying to improve one essential, of keeping all others intact. Therefore the sagacious breeder will pay more attention to those points indicative of heavy succulent beef laid in the primer points and without an undue proportion of fat, if combined with general symmetry, rather than style and carriage, connected with deficient characteristics in flesh. The one animal may be striking to the eye, while the other will bring the butcher's money. This is really all there is to beef cattle.

Form as an Index to Quality.

Whatever the animal, its form, organization and general make up, will be an indication of its true type and character. It is a fixed law of nature that this should be so. A few illustrations will suffice, and which will easily commend themselves to the reader.

The thorough-bred horse, is courageous, high strung, active, sinewy, impatient under restraint, and not given to carry much flesh or fat. The heavy draft horse, carries much flesh, is docile, honest at the collar, pos-

sessing great bone and sinew, and is on the whole more sluggish. The horse of all work should be a modification of both these characteristics. All horses have great chests, and consequently great lung power, fitting them for severe and long continued muscular exertion. They must be judged by a standard where muscular exertion is the important integer. Cattle have been bred so long with reference to their bodies, as beef or milk producers, that they have become so distinct from the supposed wild type as to possess but little in common therewith. The head, neck and limbs, have been refined, the lungs have less power, since it is only necessary that they supply sufficient oxygen to the blood to keep up a uniform animal heat under exercise, never violent. The loin and rump are broadened, the ribs spring out more to give capacity for a stomach of size to digest a large quantity of food. In swine the diminution of lung power is particularly seen. They are essentially slow in all their movements, and averse to exertion. Their forte is simply eating, sleeping and laying on fat. No one would mistake a hog for either an ox or a horse. The intelligent breeder so educates his eye and his touch, that he can distinguish between animals of any given race as to their capabilities for the purpose intended. The external conformation comes at length to be so keenly associated with the correlated structural affinities, that he tells at once, and exactly, the important points that would entirely escape the uneducated eye and touch.

Practical Suggestions.

As the greatest excellence in the production of meat, milk or labor in cattle; of wool and carcass in sheep; and of hams, loin, side meat and lard in hogs, involves peculiarities of structure and function—adapting the animal to the special purpose for which it was intended, and as all these require close study of anatomy, physiology, and the correlations existing in the different forms of production; and since scientific breeders have for the last hundred years been seeking to establish a higher and higher excellence, the intending breeder would be unwise to undertake to breed up from the common herds of the country. It would be time ill spent. He should first inform himself of the practical necessities within his reach, and breed from types already existing rather than create one. This will simplify his study, he must educate his eye by points and the observation of the best animals, and his touch by feeling them according to the rule heretofore given; and this brings us to

Breeding Grades.

At the meeting of the American Association of Short-Horns, at India-

napolis, 1872, "pure-bred," "full-blood," and "thorough-bred," were defined as being synonymous terms, and to indicate "animals of a distinct and well-defined breed, without any admixture of other blood." The following definitions were adopted by the association.

"'Cross-bred'—Animals produced by breeding together distinct breeds."

"'Grades'—The produce of a cross between a 'pure-bred' and a 'native.'"

"'High grade'—An animal of mixed blood, in which the blood of a pure-bred predominates."

The produce of a Devon and a Short-Horn would be a cross bred animal. In-and-in breeding is considered to be the coupling of animals of the closest relationship, as the produce of one sire and dam, etc. Close breeding is the breeding of animals together that are closely related; as animals one or two removes from the parent stock, in relationship. High breeding is sometimes incorrectly used in this connection; it is wrong. Many of our most highly bred horses are not closely related, and the same may be said of our pure cattle. High breeding properly signifies the selection of the breeding stock, within the limits of some particular family, and within a definite standard of excellence and characteristics.

How to Breed Grades.

Select the best cows you can find, that is, those that come the nearest to the standard of excellence for the purpose wanted; then select a bull combining in the most eminent degree possible the points of real excellence for the outcome expected, not in fancy breeding but in adaptability to the end sought. Thus, if for beef, he should be of fair size, not too large, certainly not too small, but of excellent fineness combined with great loins, rumps and thighs, round-ribbed, and well ribbed to the hip bones,—what a breeder would call a well bred, serviceable animal.

If for milk, the bull must have come of a line of uniform milkers, for here the udder and milk-veins are the essential part. In fact, the male must possess the peculiarities characteristic of the breed, and better if from a family of extraordinary excellence. Why? Such animals are prepotent; that is, they will impress upon their progeny the distinguishing characteristics and excellence of their race. By following the directions we shall give, in ten years one may have grades bred to such excellence that none but critical judges can tell them from pure bred cattle.

Start the Herd

With one yearling bull for each ten two-year-old heifers, selected as we have stated, and which have not been bred. Keep them from contact with other cattle, and especially keep their own bull as much in their sight as possible. The next year's produce should be ten calves, one-half of which should be heifers. Geld the steers, and make what use may be desired of them. Rear the heifer calves in the best manner possible, and with their sire and dams when in the pasture, and at other times do not allow them to see strangely marked animals, especially when in heat.

At the age of two years breed them to their sire. He will now be four years old, and should be kept simply in good flesh, not really fat, certainly not lean; but strong, vigorous and healthy. When these calves are two years old, breed again to the same sire, and so on to the fourth generation, if he last so long with vigor.

Thus this produce will inherit 15-16 of the blood of the sire, being the fourth generation from the original sire and dam. It may be formulated thus: at one year from starting the herd, you have the first generation; at four years the second; at seven years the third; and at ten years the fourth generation. They will grade as follows: First, one-half bloods; second, three-quarter bloods; third, seven-eighths bred; and fourth, fifteen-sixteenth bred.

Besides these you will also have generations successively from the original cows, or seven-eighths, three-fourths and one-half bred heifers corresponding with the succeeding years from the first. If these again have been bred to the same bull, or another pure bred bull, their produce will be respectively fifteenth-sixteenths and seven-eighths bred.

Ten Years' Produce.

Let us now figure how much stock, young and old, will be the produce of this system, allowing that none have died. In one year, from the ten cows and one bull, we have ten calves, five heifers and five steers: the second year, ten calves, the third year ten calves, the fourth year ten calves. This year we have also five calves, the produce of the first year's calves. The sixth year we will have twenty-five calves, the seventh year thirty, the eighth year thirty-five, the ninth year forty, and the tenth year forty-five calves as the produce of the original cows and their progeny, making in all two hundred and forty animals ranging in age from calves to thirteen years old, of which one hundred and twenty-five should be females.

Selection.

Just here selection may come in. Some of the cows and their progeny will have proved superior beef makers or milkers, according as they were originally chosen. Their progeny should be carefully raised and bred. It may seem dreadful, this incestuous breeding, but please remember, it is animals that are the subjects. The records of the improvement of animals and their erection into fixed breeds, will show very much closer in-and-in breeding than this. The object is not only to throw the good qualities in a lump, but to fix them by concentration. Thus a cow bred during her whole breeding life to one bull, never having had contact with another, will bring her calves nearer and nearer to the sire year by year, through the infusion of the blood of the sire into the dam, through intercirculation by means of the fœtus, during its growth.

As showing close in-and-in we find in the first volume of the American Herd Book a diagram of the breeding of Comet from Hubback, and Lady Maynard. It is explained as follows:

1. Bull, Hubback.
2. Dam of Haughton.
3. Richard Barker's Bull.
4. Cow, Haughton.
5. Bull, Foljambe.
6. Cow, Young Strawberry.
7. Bull, Dalton Duke.
8. Cow, Lady Maynard.
9. Bull, Bolingbroke.
10. Cow, Lady Maynard.
11. Cow, Phœnix.
12. Cow, Young Phœnix.
13. Bull, Favorite.
14. Bull, Comet.

. In relation to Favorite or Lady Maynard, Mr. A. B. Allen says: It was conceded by a company of old breeders in 1812, in discussing the question of the improvement of Short Horns, that no stock of Mr. Colling's ever equalled Lady "Maynard" the dam of Phœnix, and granddam of Favorite (by Foljambe) and of young Phœnix (by Favorite, her son, upon his own mother,) the dam of Comet 155) so celebrated as having been sold for 1000 guineas $5000) also by Favorite, a specimen of as close-in-and-in-breeding as can perhaps be found on record.

To show wonderful depth of in-breeding with continued good results, the cow Clarissa may be mentioned; she possessed sixty-three sixty-fourths of the blood of Favorite. Her pedigree runs thus: "Cow Clarissa, roan, calved in 1814. Bred by Mr. R. Colling, got by Wellington (680) out of—by Favorite, (852)—by Favorite,—by Favorite,—by Favorite—by Favorite—by Favorite—by a son of Hubback.

Wellington, the sire of Clarissa, was also deeply inbred with the blood

of Favorite. Taking the two pedigrees—that of Clarissa and Wellington together—they will read thus:

1. Bull, Hubback.
2. Son of Hubback.
3. Cow, by son of Hubback.
4. Bull Favorite.
5. 1st cow by Favorite.
6. 2nd cow by Favorite.
7. 3rd cow by Favorite.
8. 4th cow by Favorite.
9. 5th cow by Favorite.
10. 6th cow by Favorite.
11. Clarissa.
12. Bull Wellington, sire of Clarissa.
13. Bull, Comet.
14. Cow, Wildair.
15. Cow, Young Phœnix.
16. Cow Phœnix.
4. Same bull Favorite on the side of Clarissa's sire as on the side of her dam.
17. Bull, Bolingbroke.
18. Granddaughter of Hubback.

Exercise Common Sense.

In breeding so closely as we have advised it will be necessary that intelligent judgment be used. The effect of in-and-in breeding is to refine and render delicate the constitution. Animals closely in-bred, in fact all highly bred animals require better care than those of a coarser nature. They are not as able to take care of themselves, to shift for themselves; are in fact artificial. But on the other hand they will repay the care and attention bestowed, in increased profits for the food given. In in-and-in, or other very close breeding, care must be taken to give the animals an out cross as soon as you find they are suffering in constitution and hardiness; in fact when you find they are no longer getting better and better seek another sire, and so continue until you have got animals fully equal to any thorough-bred for all practical purposes, and that shall at the same time be marked with vigor as well as the characteristics wanted, whether they be for beef or milk, or both.

Once having begun, however, with pure sires on native stock, never by any chance allow a grade animal to become a sire, no matter how good he may be. It can only result in loss, whatever the attempt at improvement be in animals of any kind. In swine in-and-in breeding may not be carried so close as in other animals. They are scrofulous and weak lunged at best, and close breeding soon shows in the progeny. As a rule one-half or three-fourths bred are good enough to bring enhanced profits over those usually denominated land-pikes, a picture of which may be found in another part of this work.

Gestation of Cows.

There has been much surmised first and last upon the subject of the length of time of gestation, and its effect upon the sex of animals produced. It is a prevalent idea that if an animal goes over her time a male will be the result. Let us see how careful records kept by scientific men will tally with this.

Mr. Tessier, a most accurate and acute observer for over forty years, embracing various animals, gives results of over 575 cows and these subsequently having been extended to 1,131 cows the extremes were not changed but results as to averages are as stated below.

Upon the 575 cows the results were as follows: Twenty-one calved between the 240th and 270th days, the mean time being 259 days.

Five hundred and forty-four calved between the 270th and 299th days, the mean time being 282 days.

Ten calved between the 299th and 321st days, the mean time being 303 days.

Earl Spencer has also carefully tabulated the period of gestation of cows as we find in the table on the following page.

In these 766 cows the least period was 220 days; the mean 285 days; the longest period 313 days. He states that he was able to rear no calf produced at an earlier period than 240 days. Thus it may be accepted that, according to Tessier, a cow may carry a calf 321 days and produce it sound; and from the fact that Tessier and Earl Spencer agree almost exactly as to the meantime of gestation, (1,895 cows being observed), 285 days or nine and a half months may be taken as the average time of gestation of cows, slight variations being allowed from this for different breeds.

Earl Spencer was inclined to the belief that a cow would carry a bull calf longer than a cow-calf. In stating the case, he says:

"In order to try this, the cows who calved before the 260th day, and those who calved after the 300th, ought to be omitted as being anomalous cases, as well as in cases in which twins were produced; and it will then appear that, from the cows whose period of gestation did not exceed 286 days, the number of cow-calves produced was 283, and the number of bull-calves 234; while, from those whose period exceeded 286 days, the number of cow-calves was only 90, while the number of bull-calves was 152."

The author, however, omitted to notice that all the calves born after the 299th day were females, and of those born before the 260th day, 10 were females and 15 males. And again, omitting the twin-calves, 340 were females and 101 males—a large excess of bull over cow-calves. It

TABLE RELATIVE TO THE GESTATION OF COWS.

Number of Days of Gestation.	Cows.	Cow calves	Bull calves	Twin cow calves.	Twin bull calves.	Twin cow and bull calves.
220	1	.....	1	.....	.....	.....
226	1	1	.....	.....	.....	.....
233	1	.....	1	.....	.....	.....
234	1	.....	1	.....	.....	.....
235	1	1	.....	.....	.....	.....
239	1	1	.....	.....	.....	.....
242	1	.....	1	.....	.....	.....
245	2	2	.....	.....	.....	.....
246	2	.....	2	.....	.....	.....
248	1	1	.....	.....	.....	.....
250	1	1	.....	.....	.....	.....
252	2	.....	2	.....	.....	.....
253	1	.....	1	.....	.....	.....
254	1	1	.....	.....	.....	.....
255	2	.....	2	.....	.....	.....
257	2	1	1	.....	.....	.....
258	3	1	2	.....	.....	.....
259	1	.....	1	.....	.....	.....
262	1	.....	1	.....	.....	.....
263	2	.....	2	.....	.....	.....
266	1	.....	.....	.....	1	.....
268	2	2	.....	.....	.....	.....
269	2	.....	1	.....	.....	1
270	5	2	1	1	.....	1
271	6	5	1	.....	.....	.....
272	3	1	1	.....	1	.....
273	3	2	1	.....	.....	.....
274	5	.....	5	.....	1	.....
275	5	2	2	.....	1	.....
276	15	7	6	.....	.....	1
277	14	10	2	1	.....	1
278	18	11	4	1	.....	2
279	32	16	11	3	.....	2
280	35	15	20	.....	.....	.....
281	36	20	18	.....	.....	1
282	47	26	20	1	.....	.....
283	54	30	24	.....	.....	.....
284	66	33	33	.....	.....	.....
285	74	29	43	.....	.....	2
286	60	22	38	.....	.....	.....
287	52	25	27	.....	1	.....
288	42	13	28	.....	.....	.....
289	45	20	25	.....	.....	.....
290	23	10	13	.....	.....	.....
291	31	9	22	.....	.....	.....
292	16	5	11	.....	.....	.....
293	10	1	9	.....	.....	.....
294	8	1	7	.....	.....	.....
295	7	3	4	.....	.....	.....
296	6	2	4	.....	.....	.....
297	2	1	1	.....	.....	.....
299	1	.....	1	.....	.....	.....
304	1	1	.....	.....	.....	.....
305	1	1	.....	.....	.....	.....
306	3	3	.....	.....	.....	.....
307	1	1	.....	.....	.....	.....
313	1	1	.....	.....	.....	.....

is also curious in this connection to note, that of the 764 cows, 23 produced twins, or one cow in 33 1-3 of these; 7 cows had twin females; 5, twin males, and eleven had twin male and female calves. Those in the twins produced their owner 18 female calves and 16 male calves.

From the many facts collected in various races of animals, it is quite safe to conclude that the sex of the young has no particular influence on the period of gestation. It is more probable that heredity, sires, early maturity, and various other integers in the problem, may control the tendency to long or short gestation.

Food vs. Product.

The value of an animal depends upon the profit it will give in comparison with the care and expense in rearing and fattening, in the case of beef cattle, and, of the cost of feeding, in comparison with the milk yield, in connection with dairying. In this we may safely conclude that an animal will produce less and less gain the longer it is kept, and thus early maturity becomes the most important integer in the breeding of stock, whether it be for beef or milk. The reason why the mature animal consumes more in proportion to gain than the younger one is, that it takes a certain amount per pound of live weight to supply waste. The animal of a given age, according to breed and adaptability to fattening, can only arrive at a certain weight. Hence this ultimate weight reached, it will not increase. Long before this ultimate weight is reached, the animal will increase only in fat. Thus the flesh-forming element in the food is wasted, save that which supplies the daily waste in the animal economy. Thus from the data which we now present it will be seen how much may be considered necessary as food, under various conditions.

Conclusions from Experiments.

Prof. W. S. Johnson, in his report of the Connecticut Agriculture Station for 1877, gives the following translations from Dr. Wolff, a German experimenter. These, of course, must only be considered as approximative. They, however, will show as being the result of practical experiment—principles upon which ratios may be made up of other material.

Dr. Wolff, in illustrating the standard for a milch cow, says that 30 lbs. of young clover hay will keep a cow in good milk; that this contains of dry organic substance 23 lbs., of which is digestible—albuminoids 3.21, carbo-hydrates 11.28, and fat 0.63. This is 71 lbs. albuminoids more, and .22 lbs. of carbo-hydrates less, with .13 lbs. of fat more, than the standard. The richest and best meadow hay contains in 30 lbs., of organic substance 23.2 lbs., having digestible albuminoids 2.49 lbs., carbo-hydrates 12.75 lbs. and fat .42 lbs. This comes very near the feeding standards.

Feeding Standards.

PER DAY, AND PER 1,000 LBS. LIVE WEIGHT.

	Total Organic Dry Substance.	Nutritive Digestible Substances.			Total Nutritive Substances.	Nutritive Ration
		Albuminoids.	Carbohydrates.	Fat.		
1. Oxen at rest in stall	17.5 lbs.	0.7 lbs.	8.0 lb	0.15 lb	8.85 lbs	1:12 lbs.
2. " moderately worked	24.0 "	1.6 "	11.3 "	0.30 "	13.20 "	2:7.5 "
3. " heavily worked	26.0 "	2.4 "	13.2 "	0 50 "	16.10 "	1:6 0 "
4. " fattening, first period	27.0 "	2.5 "	15.0 "	0.50 "	18.00 "	1:6.5 "
" " second period	26.0 "	3.0 "	14.8 "	0 70 "	18.50 "	1:5.5 "
" " third period	25 0 "	2 7 "	14.3 "	0.60 "	18.00 "	1.6.0 "
5. Cows in milk	24.0 "	2.5 "	12.5 "	0.40 "	15.40 "	1:5.5 "
6. Growing Cattle:						
AGE—MONTHS. AVE. LIVE WT. PER HEAD						
2— 3 150 pounds	22.0 "	4.0 "	13.8 "	2 0 "	19.8 "	1:4.7 "
3— 6 300 "	23.4 "	3.2 "	13.5 "	1 0 "	17.7 "	1:5.0 "
6—12 500 "	24.0 "	2.5 "	13.5 "	0.6 "	16.6 "	1:6.0 "
12—18 700 "	21 0 "	2.0 "	13.0 "	0.4 "	15.4 "	1:7.0 "
18—24 850 "	24.0 "	1.6 "	12.0 "	0.3 "	13.9 "	1:8.0 "
PER DAY AND PER HEAD.						
2— 3 150 "	3.3 "	0 6 "	2.1 "	0.30 "	3.00 "	1:4.7 "
3— 6 300 "	7 0 "	1.0 "	4 1 "	0.30 "	5.40 "	1:5.0 "
6—12 500 "	12.0 "	1.3 "	6.8 "	0.30 "	8.40 "	1:6.0 "
12—18 700 "	16.8 "	1.4 "	9 1 "	0.28 "	10.78 "	1:7.0 "
18—24 850 "	20.4 "	1.4 "	19.3 "	0.26 "	11.96 "	1:8.0 "

To show how a ration for milk cows may be arranged of various material, he gives the following:

Ration for Milch Cows.

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Carbohydrates.	Fat.
	lbs.	lbs.	lbs.	lbs.
12 pounds average meadow hay	9.5	0.65	4 92	0.12
6 " oat straw	4 9	0 08	2 40	0.01
20 " mangolds	2 2	0 22	2 00	0.02
25 " brewers' grains	5.6	0.98	2.70	0.20
2 " cotton-seed cake	1.6	0.62	0.36	0.21
	23.8	2.55	12 38	0.62
Standard	24.0	2.50	12 50	0.40

Prof. Johnson gives the following rations, calculated from the table:

20 pounds cured corn-fodder	13.7	0.64	8.68	0.20
5 " rye straw	4.1	0.04	1.82	0.02
6 " malt sprouts	5 0	1.16	2 70	0.10
2 " cotton-seed meal	1.6	0.62	0.36	0.24
	24 4	2.46	13 56	0.56
Standard	24.0	2.50	12.50	0.40

Or, again:

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Carbohydrates.	Fat.
15 pounds corn-fodder	12.1	0.16	5.55	0 04
5 " bran	4.1	0 59	2 21	0 15
5 " malt sprouts	4.1	0.97	2 25	0.08
3 " corn-meal	2.5	0.22	2.05	0.07
2 " cotton-seed meal	1.6	0.02	0.36	0.24
	24.4	2 56	12.42	0 58

A correspondent of the *National Live Stock Journal* gives the following as a practical ration which he used to feed forty steers, weighing an average of 900 lbs., and gaining 2 1-2 lbs., per head, per day:

12 pounds oat straw	9 80	0 17	4.81	0.08
5 " hay	3.98	0 27	2.05	0.05
6 " corn-meal	5.04	0.50	3.64	0.28
4 " bran	3.22	0.50	1.70	0.10
2 " Linseed meal	1.61	0 47	0.70	0.18
	23.65	1.91	12 90	0.69
Standard for fattening cattle of this weight	24 30	2 25	13 50	0.45

This corresponds quite closely with the German standard. The albuminoids are slightly less, and the fat more. One gallon of cheap molasses added to the rations of hay for forty head, would nearly bring up the carbo-hydrates to the standard. Again he says: The following is a practical ration fed to 10 steers for 90 days; their average weight for the 90 days being 1,348 lbs.; and this was the average ration fed—the average gain being 3 lbs. per head, per day:

15 pounds oat straw	12 25	0 21	6.01	0.10
6 " hay	4.77	0.32	2.46	0.06
7 " corn-meal	5 86	0.59	4 24	0.33
3 " pea-meal	2 48	0.51	1.32	0.05
3 " oat-meal	2 48	0.29	1 29	0.14
1 " flax-seed	0 86	0.17	0.18	0.29
	28.70	2.09	15.50	0.97
Standard for fattening cattle of this weight —3d period	33 70	3.63	19.95	0.80

This seems a wide departure from the German standard; but that all the conditions may be understood, it is stated that the corn, pease, oats and flax-seed, in the proportions stated, were mixed and ground together, and then 14 lbs. of the mixed meal was mixed with the 15 lbs. of oat straw, cut into inch lengths, and all well cooked together; that is, 420 lbs. of the ground meal was mixed with 450 lbs. of cut oat straw, placed in a steam-box and well cooked with steam, and this served for three

days' rations for the 10 head, except that 6 lbs. of long hay was given to each at noon. Perhaps the explanation is, that the cooking rendered a so much larger per centage digestible, that it was, in effect, equal to the German standard. These steers weighed 1,210 lbs. when the experiment began, and 1,485 lbs. at the end of 90 days; so that 1,348 lbs. was the average weight during the period. The meal ration was but 10 lbs. during the first two weeks, and increased gradually up to 16 lbs., at the end of 60 days; making the average ration 14 lbs. per day.

As supplementary to this we give three rations applicable to the East, South and West, in the order named:

CLOVER AND CORN RATION FOR FATTENING CATTLE OF 1200 LBS.

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Carbohydrates.	Fat.
	lbs.	lbs.	lbs.	lbs.
20 pounds best clover hay	15.20	2.14	7.52	0.42
5 " straw or cornstalks	4.10	0.04	1.82	0.02
15 " corn-meal	11.77	1.17	8.48	0.50
	31.07	3.35	17.82	0.96
Standard for fattening cattle of 1200 lbs., 2d period	31.20	3.60	17.70	0.84
OF PEAS AND OATS, DRIED IN BLOSSOM, WITH CORN-MEAL.				
27 pounds pea and oat hay	20.60	2.16	9.61	0.48
12 " corn-meal	10.09	1.00	7.27	0.57
	30.69	3.16	17.88	1.05
WINTER RATION OF WESTERN CATTLE, CORN AND STALKS.				
20 pounds dry cornstalks	16.52	0.16	7.30	0.08
20 " ear-corn	16.82	0.68	12.12	0.96
	33.14	1.84	19.42	1.04

It will be of interest now to show the chemical composition, digestibility and money value, according to the German standard, for 2,000 lbs. of clover hay, meadow hay, corn fodder, oat straw, oil cake, wheat bran, corn meal and oats. These foods, used more in the United States than any like number of others, are also complementary to each other: (See table on following page).

Comparing Values.

The comparisons of values by the ton of these very dissimilar foods is as follows: We find clover hay worth $17.82 and oat straw $9 per ton; but it cannot be inferred that oat straw would be as cheap at that price as clover hay to make an entire food for cattle, or other animals, because clover hay is a well balanced food for cattle and oat straw is only a

RELATIVE VALUE OF DIFFERENT KINDS OF FOOD.

	In 100 pounds.	Digestible.	In 2,000 lbs.	Money Value.
CLOVER HAY.			lbs.	
Albuminoids	15 3	10.7	214	$9 24
Carbo-hydrates	35 8			
Crude fibre	23.2	37.6	752	6 76
Fat	3.2	2.1	42	1 82
			1008	$17 82
AVERAGE MEADOW HAY.				
Albuminoids	9.7	5.4	180	$4 68
Carbo-hydrates	41.6			
Crude fibre	21.9	40.1	820	7 38
Fat	2 5	1.0	20	87
			918	$12 93
CORN FODDER.				
Albuminoids	4.4	3.2	66	$2 86
Carbo-hydrates	37.9			
Crude fibre	25.0	43.4	868	7 81
Fat	1.3	1.0	20	87
			954	$11 54
OAT STRAW.				
Albuminoids	4.0	1.4	28	$1 21
Carbo-hydrates	36.2			
Crude fibre	39 5	39.5	802	7 21
Fat	2.0	0.7	14	61
			844	$9 61
OIL CAKE.				
Albuminoids	28.3	23.77	475	$19 00
Carbo-hydrates	32.3			
Fibre	10 0	35 15	703	6 32
Fat	10.0	9.0	180	61
			1358	$33 12
WHEAT BRAN.				
Albuminoids	15.0	12.6	252	$10 92
Carbo-hydrates	52.2			
Fibre	10.1	42.6	852	7 67
Fat	3.2	2.6	52	2 25
			1156	$20 84
CORN MEAL.				
Albuminoids	10.0	8.4	168	$7 28
Carbo-hydrates	62.1			
Crude fibre	5.5	60.6	1212	10 90
Fat	6.5	4.8	96	4 16
			1476	$22 34
OATS.				
Albuminoids	12.2	9.0	180	$7 80
Carbo-hydrates	55.0			
Crude fibre	9 3	43.0	860	7 74
Fat	6.5	4.7	94	4 07
			1134	$19 81

partial food, containing so little albuminoids and fat that cattle would starve to death upon it if fed long enough. The muscles and nerves could not be nourished upon it; and yet a good article of oat straw is worth the price named, because of the digestible heat and fat formers it contains. Now, put a ton of the best oat straw with a ton of the best clover hay, and you have a fairly balanced food. It compares well with common meadow hay. The digestible albuminoids in clover 10.7, in straw 1.4, making the two added 12.1, and the average per cent of the mixture is 6.05, whilst meadow hay is only 5.04. The digestible carbohydrates in the mixture is about 39.0 to 41.0 in hay, and the fat is 1.4 to 1.0 in meadow hay. The parallel is very close; and as the mixture has slightly more albuminoids and fat, it may be considered the better ration. These valuations of the different elements simply mean that each is worth the relative price named when fed in due proportion with the other elements. Oil-cake, for example, is as far from being a balanced ration as oat straw, for it contains as much too large a proportion of albuminoids as straw does too small. It has also oil in excess. Like straw it must be fed with other foods. If 400 lbs. of oil-cake be mixed with a ton of oat straw, the mixture will make a ration equal to meadow hay.

Feeding Where Corn is Cheap.

When stock of any kind is kept and fattened in stables, on ground or cooked food, these tables will be found valuable. So far as our own experience goes we have found that for growing animals there is nothing better than equal weights of corn and oats, or corn and barley, with what good hay or shocked corn fodder they will eat. We have also found that when corn was less than 30 cents per bushel it did not pay for grinding even for cattle, if it could be fed in the ear or in the husk, the experiments being based on the toll taken, and the cost of hauling ten miles to mill. For sheep, horses, and hogs it will not pay for grinding when it is less in price than 40 cents per bushel.

In all that great scope of country in the West known as the corn zone, the most economical manner we have ever found in fattening cattle was to feed, first, shock-corn; next, snapped corn; and, third, husked corn in the ear. In feeding the two latter, the animal weighing 1,000 pounds should have about 25 pounds of corn and 10 pounds of best hay.

In feeding shock corn the animal will eat no more than it requires, and it should have twice a day whatever it will eat up clean, of ears. In feeding in this manner in the fields or dry yards with abundance of water, allowing hogs to run after the cattle after they have finished the ears, to pick up wasted corn and droppings—if the cattle are sheltered from wind and storm, they may be most economically fed and to very heavy weights.

Raising Young Cattle.

Here again the breeder must be guided by sound judgment. It will not pay to starve even the commonest stock. A calf, to use a common expression, "knocked in the head with a pail of skimmed milk," will never make a first class steer or cow. Neither is it necessary that they suck the cow. In fact, in the case of dairy cows or heifers intended for the dairy, they should not suck, for it surely tends to diminish the flow of milk, except the calf is turned with the cow at stated intervals, and the cow milked clean at the same time. In the case of heifers, they should be milked as soon as the calf has drawn the first milk, both as a means of training and to develop the flow of milk as much as possible; besides this, a calf taken at two or three days old is easily taught to suck the finger or an artificial teat attached to a reservoir.

The First Two Weeks,

They should have nothing but new milk. It should be as warm as it comes from the cow, and the calf should be fed four times a day. Then they may have milk twelve hours old, from which the cream has been taken, adding four ounces of finely ground meal made into thoroughly cooked mush, to each meal, for strong, hearty calves. Thus they may be fed for two weeks more, changing to oat-meal or wheat flour if the calf is inclined to scour. Some feeders add a teaspoonful of linseed meal once a day. It is not a bad plan. When the calf is four weeks old it need be fed but twice a day, giving milk warmed to about ninety or ninety-five degrees, which last is the natural animal heat. From this time on more and more mush, or its equivalent may be added as the calf increases in size and strength, until it begins to eat grass and threshed oats, which it should be encouraged to do.

Feed Early.

At ten weeks old it should eat freely, and at three months old it may be gradually weaned from milk and taught to subsist on grass and oats. During all this time the calf should be sheltered from the hot sun and rain, by providing a shelter to which it may retire, well ventilated, dry and clean, and sufficiently dark to keep out green-head and other biting flies. In the autumn its rations of grain should be increased, and as grass fails the finest meadow hay should be substituted—whatever it will eat clean of both. Offer it water occasionally after it is a month old, and when weaned see that it never lacks for water.

Figuring Profits.

During the winter keep the calves in the warmest quarters possible; feed liberally with grain and hay, and in the spring you will have the satisfaction of knowing that you have received the best profit that you will ever reap from the animal at any subsequent age; but upon comparing debit and credit with your neighbor who has fed skim-milk alone in summer and poor hay in winter, you will find that the loss on his calves has gone in the shape of profit in yours.

From this time on feed liberally of grain in the winter, and give a little all summer when they will eat it. Let them in winter be so warm that they never become chilled. So continue until the animal is within six months of being ripe for the butcher. Then feed the best you can, and you will be rejoiced to find that you may get two to three cents a pound gross weight more than your neighbor who has only half fed and has turned off his cattle totally unripe for the butcher.

The same rule will hold good for those calves intended for cows. To make a good cow, she must be fed well to bring early development and maturity. She may thus be brought forward strong and lusty, and in better condition at two years past to bring you a perfect calf, than those of your neighbor at twice that age, whose policy has been to grudge them feed and allow them to shift for themselves.

Castration.

When the bull calves are three weeks old, if in good health, they should be castrated. It should certainly be done before they are four weeks old. Many of our best stock raisers incline to the opinion that as soon as the calf begins fairly to gain size and flesh, say at two weeks old, is the proper time. We have never had better success than at this time. Every person who purposes to breed cattle should know how to do this. The operation is quite simple, and easily performed.

Secure the calf so it may remain standing on its feet, but cannot struggle severely. Have a knife ready with a keen-edged blade. The blade of a budding-knife is the proper shape. Seize the scrotum from behind, and with two light, swift, sharp strokes cut through and into the testicle. Separate the membrane where it unites, pull the testicle out until the cord shows from four to six inches, and cut it with a pair of nippers or rather dull shears. It will save loss of blood. So operate with the other, and the work is done. If from any cause severe bleeding ensues, inject a little tincture of muriate of iron into the cavities, and wet a soft rag with the tincture and press it well into the cavity. If these be not at hand, push a little salt and lard into the cavity. If the operation has been care-

fully performed, nothing will generally be required. The calf should be kept free from interference by other animals

Until the Parts are Healed,

which will usually occur in a week. If they have been used to the company of other calves, they should not be deprived of it now, else they will pine. One reason why we advise early gelding, is, it should be done before the calf is taken off of new milk, and it should not be deprived of the natural milk until it recovers from the shock. Care must be taken that flies do not get near, to deposit their eggs in the parts operated on. To prevent this, if there are flies, keep the calves in a pretty dark, but well ventilated place. Most persons will find it awkward at first to geld as we have directed. A little practice, however, with tact and firmness, will render all easy, especially if one can have the advantage of seeing an expert operate once.

Sometimes Suppuration Ensues.

In this case recourse must be had to mild palliative measures. Keep the parts washed clean, twice a day, with warm rainwater and castile soap, and inject a small quantity of tincture of aloes and myrrh. If the parts become unhealthy, or ulcerated (for mere suppuration is healthy action), wash with a weak and clear solution of sal soda, or hard wood ashes. If proud flesh should arise (a rare occurrence), burnt alum, pounded very fine may be applied, or the parts may be touched with lunar caustic.

CHAPTER III.

TRAINING AND WORKING.

TRAINING VS. BREAKING——TRAINING THE CALF——HALTERING——TRAINING TO MILK——FEEDING AT MILKING TIME——VICIOUSNESS IN COWS——HOOKING COWS——TRAINING OXEN——TRAIN STOCK YOUNG——SUMMING UP——MANAGING A KICKING COW.

Training Cattle vs. Breaking.

The word "breaking" horses or steers to work, or breaking a heifer in to milk, has now-a-days become pretty well obsolete. Breaking by brute force may make a kind of a machine of an animal; it may do stupidly

WORKING BY MAIN FORCE.

what is desired, and yet not do it to the best advantage. Intelligent persons now do not break an animal by destroying its will, they simply make it subservient to that of man, by letting it know at the first hampering for training that it will not be hurt, if it does not resist. All domestic animals are naturally subservient to the will of man; they require to be taught what is wanted, and the individual should know that no good can come out of any system of training which compels the use of the whip constantly. The whip is necessary only as a means of correction, when an animal is refractory after understanding the will of the master. An intelligent trainer will easily distinguish between stubborn antagonism and a want of comprehension. We have never seen young animals stubborn, except that they did not understand what was wanted of them; and in animals that have at length been made to work in the yoke, or to stand quietly to be milked, but which have "freaks," as they are called, when they seem wild or stubborn, it is usually the result of bad treatment in "breaking," and the animal is actuated almost solely by fear. If, in the struggle which ensues, the animal becomes master, it is thereafter of but little use. It is better in training that the struggle be not made necessary.

Training the Calf.

If the calf has been raised by hand, that is, fed with milk from the pail, it will, or should have, become so gentle and familiar as to allow itself to be approached readily, and to respond to the call of its master. Many persons at this time name every calf, and thus they soon come to know their names when called. If firmness and at the same time gentleness have been used, so that the calf will understand that there is nothing to fear; if no struggle is made, it is well on the way to understand what is further expected of it. It should be rubbed and curried occasionally, especially on those parts of the body that itself cannot reach, as the head, neck and shoulders; or, if kept in the stable constantly, it should be brushed all over at least once a day. Here is one of the first and most important lessons. At first, the calf does not know what is intended. If the master gets angry and beats it, it will ever after associate currying and brushing with a beating; and when it gets older and stronger, in the constant successions of struggles to escape punishment, it will at length find it is the stronger animal of the two. Thereafter itself and not the man is master. The object of currying is not to give pain. It is an operation of cleaning that the animal cannot perform for itself, because confined in a stable. If the animal is turned out during

the day, and confined only at night; or if it have the range of the yard and sheds day and night, the cleaning is not needed. Animals can and do perform these offices for themselves and for each other by licking, so far as is necessary. The accumulating scurf in an out-door life is a provision of nature for the protection of the animal. It should not be touched. In the stable, however, it is different. The lack of exercise tends to a sluggish movement of the blood, and hence a clean skin becomes one of the most active integers in preserving the health of the animal. In using the comb or brush, or, in the case of cattle, the card and brush, a light hand with the comb and card will do better work than a heavy hand. It should be unnecessary to say that about the bony parts the card or curry-comb should never be used.

Haltering.

The first thing a calf should be taught is to stand quietly when tied, and under all circumstances. If it is taught this by being tied up immediately upon being taken from the cow to be fed milk, or at from three days to a week old, there will be no difficulty. If the calf has run with the cow, it will be strong and lusty. In this case, the lot if they are to be stabled, should be put into a close pen, and a strong halter fastened to the head, of one of them, using discretion and time so as not to frighten the animal. Once secured, two men will easily place it in position in the stable. So proceed until all are handled. Here they may be gently handled until quieted, whatsoever the manipulation.

The next step will be teaching it to lead. Take it into a closely fenced yard, having the calf haltered at the end of a ten-foot rope: stand in front of it and utter the word "come." Of course, it will not move. Utter the word again, and at the same time let an assistant tap it lightly with a buggy whip on the legs, from behind, or hold the whip yourself and tap it on the forelegs at the utterance of the word. The animal will soon understand what is wanted and come forward. It should then have something it likes, the least possible lick of salt, for instance. From this time on you will have no difficulty in teaching the calf to follow quietly; in fact it may be taught to do many things: to back or come forward at the order; to turn to the right or left. In fact, it should be half broken to milk before it has had a calf, or should be half broken to labor before the yoke is put on.

To illustrate the difference between this plan of uniting firmness with gentleness in the training of cattle, one has only to observe the difference in cattle on different farms. The stock of the brutal farmer will never willingly allow the owner to come near them. If a master's animal be in

a corner and he approaches, there is a dash to escape, and perhaps some young animal is maimed. Such stock soon acquire the habits of their master: they are morose, ugly, often vicious; for in a herd under bad management animals sometimes get the better of the master, and are apt to become breachy, tricky, and generally unmanageable.

Training to Milk.

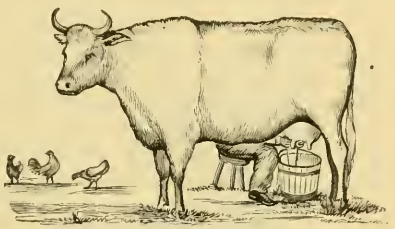
In training to stand quietly while being milked, the udder should be often handled while the heifer is growing up; the bag should be rubbed; it should be pressed and the teats gently pulled. This need take but very little time. The real work comes when the animal is to be milked. There are many things to be taken into consideration here. The heifer must be put in a pen where she cannot hurt herself, and where the milker can operate easily; a pen just long enough and just wide enough for the heifer to stand in, five feet high and tight enough so there will be no danger of the heifer injuring herself, and with an opening for the milker to operate through, will thoroughly subdue the wildest. Generally, all that is needed will be to tie the heifer by the head, and then patiently show her that she will not be hurt. She will soon come to associate the act of milking as easing the udder and thenceforward will stand quietly, unless the bag or teats hurt her. If so, seek the cause of the difficulty and cure it.

RESULT OF BAD HANDLING.

If the animal has never been tied up, but has been handled in the yard, one person may take the heifer by the horns, while another milks. If she be very refractory she may have to be "nosed." Seize the off horn firmly with the right hand, and thrust the two first fingers and thumb of the left hand into the nostrils, clasping the membrane tightly if she struggles severely. So soon as the struggles cease, ease the pressure of the fingers in the nostrils. If she again struggles, again tighten the grasp. Let the milker use gentleness. It does no good to kick an animal: it may do much harm. If the heifer kick, it is probably because she is hurt. A person of ordinary strength need not be kicked while milking, unless in the case of a cow of extraordinary strength and viciousness. The wrist of the left hand holding the teat, if kept well against the stifle, and pressed firmly back when the foot is raised, will

generally cause it to be set down in place again. Use soothing words when the animal is quiet, and low but firm words of command when refractory. If the udder is inflamed, as is very often the case soon after calving, bathe it carefully with cold water, so as not to shock the animal. She will soon come to associate a feeling of relief with the operation and like it. In fact, the whole art of training may be summed up in the sentence: *Use discretion and judgment, and show yourself superior to the brute—in truth, its friendly master.* The conquering of brute force by brute force is a relic of barbarism. There are vicious animals as there are vicious men; there are dangerous animals as there are dangerous men. Both may have been bred or educated thus. Vicious men are placed where they cannot injure their fellows; vicious animals had better go to the butcher—they are as unprofitable to breed from as they are useless for what may be got out of them.

As showing the effects of bad and good handling, we give the picture of a cow made wild and vicious by bad handling, and that of a cow used to kind treatment and gentle but firm handling. The reader can draw his own conclusions as to which is the best system.



RESULT OF GOOD HANDLING.

Feeding at Milking Time.

Some persons, to induce gentleness, give the cow a mess before sitting down to milk. This is a bad plan. It leads the animal to expect it, and if it is not given, even if she is gentle, she is restless and discontented. The very act of feeding induces moving about more or less, and prevents standing as quietly as she otherwise would. On the other hand, if she be fed after milking time she will stand quietly and entirely at ease. Many good handlers feed before milking. By the time the whole are fed and the stable cleansed the cows will have finished and be ready for milking. This is the plan we have always pursued, and we think the better one: Before sitting down to milk we have been accustomed to have the milker give the cow to be milked the slightest lick of salt from the hand, or a single mouthful of extra nice soft hay. When you begin milking do not intermit until the cow is milked entirely clean. Milk fast. Slow milking not only worries the cow but tends to dry her

up. If the milk is not drawn as fast as it is given down it is apt in the end to be withheld.

How to Milk.

Supposing the cows to be in the stable, after feeding, and cleaning the stable and the animals themselves, carefully wash the udder and teats, if they are dirty, or thoroughly brush with a soft brush, or wipe with a cloth if only dusty. Sit down quietly on the off or right side of the cow, the face slightly to the rear; take hold of the rear teat furthest from you with the left hand, and speaking the word "hoist," slowly and in a low but firm tone, press the arm against the leg, to carry the foot in place slightly behind the other. In milking, grasp the upper portion of the forward teat nearest you, so the hands operate the teats diagonally. In grasping the teats, do so well up towards the bag, according to the length of the teats, with the thumb and forefinger, and pulling gently down, at the same time, close the other fingers, thus forcing out the milk. So proceed, first with one hand and then with the other, until the milk is pretty much drawn. Then change to the other teats and finish them.

In stripping do not use the thumb and finger, pulling the teat from the root to the end. It is a senseless plan. Every drop can be had by pressing the top of the hand well up under the bag, gathering the milk with the thumb and forefinger, and drawing the milk with the others.

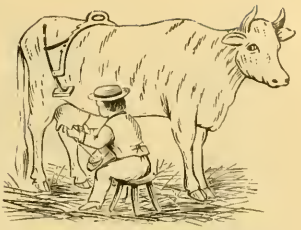
Viciousness in Cows.

Sometimes a person will have a cow that is given to viciousness from bad training, and which may be so valuable in other respects that the owner may not wish to part with her. She may be a kicker. If so, and she be strong and decidedly ugly, use the following apparatus, which will explain itself, and which, by the lever and notches, may be made to grip tightly into the flank. Another plan is to draw a strong cord quite tightly around the girth. The most usual plan, in the stable, is to buckle a strap around the legs and to fasten it to a ring in the wall behind, so the cord will be loose when at rest, and yet so tight that the cow cannot get her leg forward to do mischief. The cut we give will show the first device mentioned and the manner of fastening:

Cows Sucking Themselves.

Sucking themselves is another bad habit which cows sometimes acquire. There are two objections to such cows. The first is, we lose their milk, and not rarely other cows will acquire the habit from them. It is a well

known fact that self-sucking cows are generally good milkers. It is quite certain that they acquire the habit from the fact that the milk pressure in the bag hurts them, and in rubbing the udder with the nose they at length get a taste of the milk, and thus become fixed in the habit. Hence the necessity of regular milking, and often enough to keep the udder from being unduly strained. There are various devices for preventing this vice. One is a halter and nose piece, with spikes, similar but larger than those used upon calves to prevent sucking. It is given below, but besides hampering the animal to a considerable extent in gathering her food, it is not always effectual.



TO PREVENT A COW FROM KICKING.

A very simple, and said to be effective means, is to take a tough hickory stick, fourteen inches long, three-fourths of an inch thick in the center, sharpened to a point at each end; cut a grove around the center, half an inch wide, and half the depth of the thickness of the wood. Whittle each end nicely to a point, or leave it somewhat blunt, and insert a sharpened piece of wire in each end. Make a hole in the animal's nose, in the soft portion, but close up to the hard membrane of the nostrils, as you would for ringing a bull, and small enough so it will require considerable pressure to slip the bulge of the stick until it reaches the middle notch, when it will remain fixed. This does not prevent the animal from feeding, nor being fastened in stanchions, and it must be an inveterate sucker that will draw her milk with this jewel in her nose. Still another but more complicated yet quite effectual plan is given in the cut on next page.

TO PREVENT SUCKING.

Hooking Cows.

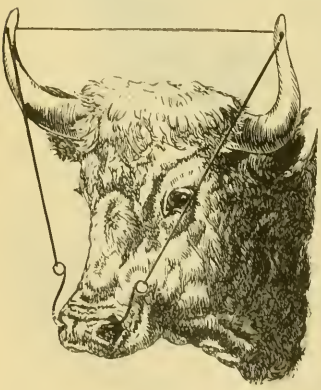
Another vicious habit sometimes acquired by otherwise excellent cows, is the vice of attempting to gore every animal that comes near, that they can master, and even individuals. Various devices have been recommended to prevent this. One is a bar across the horns, to which is

HARNESS TO PREVENT SUCKING

fastened a slender, springy piece of hickory to reach a position just above the nostrils and armed with a sharp peg underneath, so that the slightest pressure will cause it to wound the nose. In a majority of cases balls placed on the tips of the horns, and which may be purchased at any hardware store, will suffice, if the animal is not vicious to mankind.

These are made to screw on. To do so fasten the cow securely, and if the horn is too large to take the ball pare it down till it will fit. Stick a large potato baked soft, and thoroughly hot, on each tip of the horn. It will soon soften it, when the ball may be easily screwed on with the proper tool, and will never come off. In the case of animals vicious to man, the following device, which the cut fully explains, will prove entirely effectual.

Training Oxen.



TO PREVENT HOOKING.

The value of a working ox lies not only in its ability to draw a heavy load forward; to be thoroughly good in mud, or on roads; to be able to back whatever he can draw forward, and to be quick-paced. It is true you cannot make a slow breed fast, nor a lazy ox active; neither can you make an ox that lacks muscle do heavy work. If the reader has studied the characteristics of the Devons as we have presented them, he will be pretty well able to judge whether an animal under inspection will be fit for the yoke. If not fairly perfect in the principal points, discard him. It will not pay to train an inferior steer. If he is to be used for very heavy work, agility must to a considerable degree be sacrificed to weight and muscular power. As a rule, however, it is better that you use three

yoke of medium sized active steers in the team rather than two yoke of heavy, lubberly, snail-paced brutes that are always vexing the driver.

Select such as will walk evenly, look as nearly alike as possible so that they may be hitched together: first, for disposition, carriage, and pace: and second, for color and general appearance. If they are three years old, and to be put to work immediately in a breaking or freighting team, select a pair of mates, hamper by first roping and tying, and then yoking together. So proceed until you have the team, whatever the number, made up. Once yoked, they should not again be released until they cease struggling, and work quietly in the team. Fasten them together, three, four, or five yoke, as the case may be, putting a well broken steady yoke of oxen on the lead. Thus you may have a team in a few days that will learn to pull steadily forward and turn "haw" or "gee"

A PRIMITIVE TACKLE, BUT GOOD TRAINER.

—to the left or right—as is wanted. They, however, will never become a team, in the sense of the word, as used by those who know what a trained yoke of oxen are.

To properly train steers, they should be taken when quite young. Selecting one at a time, halter-break him as heretofore directed, cause him to come close to you by tapping him on the forelegs with a light whip. Teach him to walk quietly, but at a quick pace, at your side, you holding him lightly by the halter, neither before nor behind, but directly and closely at your side. Make him turn to the right or left at will, and teach him to stand quietly when so ordered. In all this do not hurry. Be quiet, low-voiced, patient but firm.

Train Stock Young.

Let the steer, which should not exceed one year old—eight months is better—be taught one lesson at a time, and that thoroughly. It will render the next lesson easier. When they are quiet and will do your bidding in the yoke without halter or strap, they may be left until three years old before being worked, though it is better to begin at two years of age, especially if they are to be used on the wagon. They will not pull much, but they may thus be taught to walk fast, to do their share of the work, and to become thoroughly "way wise."

The greatest difficulty in training oxen, as a single yoke, is teaching them to back promptly and well. To do this requires patience. Never overload them. Make them back promptly twelve to fifteen feet at a time, and then come forward, stopping instantly at the word, with heads up ready to back again. In traveling along the road never allow them to flag, nor exert them so long at any one time as to seriously weary them. Patience alone will secure the end sought. When you have occasion to speak sharply to them, do not let it be in a very loud voice, but let it be accompanied by a touch of the goad or a blow of the whip sufficiently sharp so the animals feel it. To touch both animals so near together that it seems almost simultaneous, is a fine art. It is acquired by always touching the slow ox first, for scarcely ever will two animals be found so evenly matched as to be exactly alike. When you find them you have a prize. When not so, we have always found it best to have the slower ox on the near side.

Summing Up.

In summing up the whole matter of training, the individual must keep the points aimed at steadily in view. First, the animal must be rendered entirely subservient to man, and this by showing it that man is its friend; that under no circumstances is it to be injured. A well trained yoke or a team of oxen will command a fancy price as easily as a well trained span of horses. There will be, for many years to come, uses to which neither horses nor mules are so well adapted as are oxen. In lumbering, especially in breaking prairies, in much of the work of the farm, and for teaming in wild regions generally, where there is nothing but rank, wild grassy feed, they will be indispensable. In these cases the trained team will do one-third more work than the untrained team, and do it easier for themselves, and much more satisfactory to the driver. Here again the driver should be himself trained. A brutal driver will soon ruin a good team, yet cannot entirely destroy their value.

An intelligent driver will accomplish what he wants without undue severity; his voice and signs are the potent powers. In starting a heavy load each ox is called by name, however large the team be. They understand that they are to place themselves in position for action; every chain is straightened, every muscle is brought into tension; they get well into the yokes, and at the signal all start together. With such a team the load must come.

So with cows. The training of the heifer is begun in calfhood: she learns to rely entirely upon the master. They know his voice either in the yard or field, and come clustering about him, expecting some "tid-bit," or at least a kindly word or caress. When the first calf is dropped there is no fear of the master; he may take it and do with it what he will—only fond solicitude is shown. Let a stranger come about, and instantly this solicitude is changed to fear. If a person who has beaten them or otherwise ill-used them approaches, the fear is intensified, and if he offers to handle the calf, a battle for the mastery is likely to ensue.

We have never had any trouble in teaching a heifer to stand to be milked. If the udder is tender, as in nine cases out of ten it will be, they will gently submit to the means used for relief and seem grateful for the effort. If strange heifers are to be operated on, the first thing to teach them is, that you are a friend; whatever the time it takes, whether half an hour or half a day, do not intermit the effort until the animal is subdued. If refractory it is better that the heifer or cow be tied up at once and kept there until entirely quiet and without fear. Then fully half the work is done and the subsequent work is only a question of time.

Managing a Kicking Cow.

We once subdued an unusually refractory and kicking cow, by having her held firmly by the head while we seized the teats firmly one with each hand. There was no attempt to milk. The lesson to be given was that she could do no injury by kicking. It took three-quarters of an hour to accomplish the object. When she kicked the grasp was tightened; the wrist was brought back firmly against the leg above the hock. When she ceased kicking the grasp was relaxed, and the motion of milking was performed so far as pulling gently on the teats when she kicked, or rather attempted to do so by bringing her foot forward. She soon found it was invariably brought down again nearly in its proper position in the rear of its mate. In the end she gave up and submitted to be milked. One new lesson she had to learn, to stand without holding. This was accomplished by following her about until she was content to stand, which she

did after three or four breaks. Within a week, there was no more quiet cow in the yard than this heretofore incorrigible vixen.

A Happy Family.

As showing the benefits of superior care and training, it can be demonstrated how nicely all farm stock will get along together in peace, when owned by a small farmer who cannot afford to separate into distinct herds on account of scarcity of numbers. If raised together in the same yard each will find its proper level. They will agree kindly in a small pasture, and if the pigs are ringed there will be no difficulty about rooting up the soil; and of the different classes of animals each will eat grasses and plants not relished by the others. The fact well illustrates the adage, "A merciful man is merciful to his beast."

CHAPTER IV.

HOW TO SHELTER.

Necessity of Shelter.

NECESSITY OF SHELTER —— ARTIFICIAL PROTECTION —— A FRAMED STABLE —— A CHEAP STABLE —— ABOUT BARNS —— A COMMON SENSE BARN —— A SQUARE CROSS BARN —— BASEMENTS FOR CATTLE —— ARRANGING THE BASEMENT —— ADAPTING MEANS TO THE END —— WHAT TO PLANT.

In all climates where cattle have to be fed nearly half the year, the question of shelter becomes of the first importance. In the middle corn region of the West, cattle must be fed from four to five months; and farther north, from five to six months. If the pasture in October be only sufficient to supply the animal waste, then such feeding is entirely lost so far as profit is concerned. The object of keeping cattle is to get growth and weight. The extra food given over and above the natural waste, represents the profit. Hence in the artificial feeding of cattle the question of shelter comes in. A cold storm will often seriously reduce the weight of stock. They will begin to fall away, and before they get ready to again increase in weight they will have had a season either longer or shorter when they will perhaps neither have gained or lost. The natural heat of the animal must be kept to about 100 degrees. In fact, the natural heat is 96 degrees whatever the temperature of the air. If it falls below this the animal begins to chill, and the body is called on to furnish additional heat. So long as this can be supplied the animal lives. When it is exhausted the animal dies.

The food given may be compared to the fuel used under the boiler of a steam engine. So long as the water stands at 200 degrees no steam is produced; above 212 steam accumulates, until at length enough power is raised to start the wheels in motion. Thus it is with stock. Food must be given in proportion to the animal waste. With the thermometer at zero, and air stirring, whatever the feeding may be the animal cannot gain if exposed to the wind. Under shelter the natural heat of the

animal is conserved, and it remains comfortable. If the temperature of the stable can be kept at 60 degrees, the minimum of food only will be required. Just here two integers come in; the cheapness of food as against shelter, and the cost of labor. It is possible for food to be so cheap and labor so dear, and the price of cattle so low, that the interest

OLD STYLE FARM YARD.

on the shelter and the cost of labor would eat off the profits. It has been so in every section of the West first and last, and is so still in some new sections; but nowhere so low that cattle could be profitably fed without the protecting influence of gullies or timber to break the force of the wind. This is natural protection, and is the groundwork upon which all other is to be built.

Artificial Protection.

FARMER THRIFTLESS' MODE OF PROTECTION.

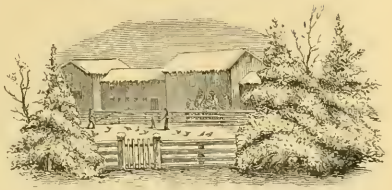
If the stock breeder has not timber, then the sooner he plants wind-breaks to protect his yards and farm buildings the sooner will he reap profit therefrom.

This is the crudest of artificial protection and yet one of great importance, both in Winter and Summer. In Winter it breaks the force of storms of wind, rain, sleet, and snow, and in Summer furnishes shade.

The next crudest means of shelter is a shed of posts and poles, and

covered with slough hay or straw, and slabs, or poles, filled in between with such litter as stock will not eat, the whole firmly pounded down to make it wind proof.

This, if well made and so low as just to admit a man to walk under, is both cheap and warm.



FARMER THRIFTY'S MODE OF PROTECTION.

Another cheap form of shed or shelter from storms is made by setting posts firmly in the ground in two lines, sawing the tops level, fastening on plate pieces, laying on scantling for the peak, supported temporarily, and nailing on boards, for a roof, at one-quarter pitch, up and down from the plates to the peak, covering the joints with wide battens and boarding up the side from whence the prevailing winds come. If twelve feet boards are used for the roof, a shed may thus be made over twenty feet wide, that will furnish good shelter for stock cattle where forage is cheap.

A Framed Shed.

A still better shed may be made by running the posts up eighteen feet, framing in cross-ties to support a floor. In the upper twelve feet of this shed a good deal of fodder may be stored, to be fed from when the weather is too inclement to allow it to be handled on wagons. From this we may go on to more and more elaborate structures until we come to the barn proper.

On all well ordered farms the owner fully appreciates the importance of shelter. Hence we see the feeding yards with one or two sides protected with more or less serviceable shed, until upon some farms we find the feeding yards entirely surrounded with this means of Winter protection.

In all this the owner must be guided by his pecuniary means. If he have not money enough to put up the better class of buildings, it by no means follows that he is to leave his stock without shelter until he is able to build.

So far as the simplest sheds are concerned, it is almost entirely a question of labor. In the case of simple sheds of lumber, it is simply a question of the cost of boards and nails.

Any intelligent farmer, assisted

PRIMITIVE PROTECTION.

by his hired help, can do the work. It is true, however, that few persons, the first time they build, do so economically. Let us see how this may be fairly accomplished. Suppose the structure is to be a simple roofed shed affair. Decide upon the length. The width should not be more than twelve feet for a single pitch roof. Allow that it is to be ninety-eight feet long. Set four heavy posts for the corners, three feet in the ground, and of the required height. The lower it is the warmer it will be, so it be high enough for the cattle to walk under the plates. Between the two end posts set, exactly in line, six posts each fourteen feet apart, and five and one-half feet high from the average ground line. Proceed in the same manner with the front, the posts to be nine feet above ground. At the back, now set seven lighter posts in the fourteen feet spaces. Saw them all off to an equal height, spike on four inch scantling from post to post in front, and two by four for the back. It is now ready for the roof, which is to be firmly nailed from front to rear. Board the front down to within five and a half feet of the ground, and the ends and back entirely to the ground. Thus the shed is complete, except banking up. This is important and will add fully one-half to its warmth. A good way to do this is to lay a line of sods one foot from the rear, and fill in with earth or old litter, carrying the banking at least four feet high; or, posts may be set two feet from the wall, with sufficient strips nailed thereon to hold the litter, and the whole filled in and rammed tight.

A Cheap Stable.

Do you prefer a stable, take the form given for a hip or double-roofed shed. Board the whole tight all around, leaving space for doors and windows; batten the cracks, lay the floor, put in stanchions or uprights for fastening the cattle, leaving a feeding place in front, and the whole is complete.

We prefer rings to slide up and down, upon standards three inches thick, to stanchions. Now this style of stable will not be strong enough to allow their being fastened to the floor above. Set strong posts seven feet apart and four and a half feet high, sawed off square on top, and three feet out from the wall. Prepare six-inch scantling to be pinned firmly to the posts, twelve inches from the ground, and on the inside next the wall; the scantling bored, each three feet, with two-inch holes. This will be wide enough for cows. Larger cattle must have three feet, three inches. Prepare other scantling bored in similar manner for the tops of the posts. Take three-inch smooth saplings; sharpen the lower ends just so they will drive firmly into the holes in the lower scantling when it is

pounded in place below. Shave the upper ends so they will fit the holes in the scantling above. Drive them solidly into the holes below, pinning each one fast with a half-inch pin. Slip a four-inch iron ring over each stake. Lay the upper scantling on top, entering the standards as you go. It is better that they have some play. Lower the scantling on top of the posts, and pin and spike them firmly to the posts. Cut stout rope six feet, six inches long, splice a four-inch loop on one end, whip the other end with small cord so it will not unravel; pass the rope through the ring and back to the loop so the end of the loop will be eight inches from the ring; pass the end of the rope through the loop, draw tight and make fast with two half hitches, or, better, whip the two portions of rope together as far as the loop. The cattle are then ready to be tied up, by passing the rope about the neck and through the loop, and drawing just tight enough so the animal cannot slip it over the horns. Iron chain bails that will last a life-time are kept ready made by agricultural implement men, and are much the cheapest in the end. Tied thus, cattle can easily reach their food, can lick themselves, can rest perfectly, but cannot reach to injure each other. A six-inch board nailed along the standard at a proper height, say about six inches below the tops of the shoulders of the cows, will prevent their reaching too far into the feeding-passage.

About Barns.

The first thing to do in the erection of any building is planning to a certainty what accommodations are wanted and the probable cost. The farm barn, if there is to be only one, must be made to answer a variety of purposes. It must contain stables for cattle and horses, calf pens, shelter for sheep, a threshing floor, bays or mows for hay and grain, room for vehicles and many tools, harness room, granary, and, if the barn is a large one, room for placing a horse-power.

Years ago barns were seldom made higher than eighteen-feet posts. In these days of improved machinery it is as easy to fill a barn twenty-five or thirty feet high as one that is lower. The nearer square or octagonal a barn is and the higher, the less its relative cost, so that now barns are built of two or three stories when a slight declivity may be had for the site. If of two stories, the basement is cut up into stables for cattle and sheep, storage for heavy tools and machinery, calf pens, etc., etc.

The main floor will contain bays for hay and grain, threshing floor, a harness room and granary. Practically there is no advantage in the third story. The barn may be as high as is needed, the bay continued to the roof; the stable, harness room, granary, etc., may be floored over, and a

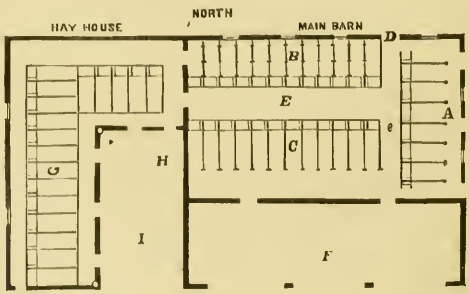
mow be had overhead; so, a floor may be carried over the threshing floor, and this space utilized in the same way. Practically you have the space at less expense.

A Quarter Section Farm Barn.

In the West and South, the farmer of 160 to 200 acres may get along very well with a side-hill barn forty-two by sixty feet. It will give ample room for a bay 16 by 60; a floor 13 by 60; horse stable 13 by 60, containing 5 single and 1 double stall, or 2 single stalls and 3 double stalls; a room for implements 10 by 13; a granary 12 by 13, and a tool room half that size; while the basement may be devoted entirely to the stabling of cattle, with calf pens, a sheep pen, and, if necessary, a shed enclosed on three sides. The granary will hold over 600 bushels of grain, and may be divided into bins for Winter and Spring wheat, oats, barley, and ground feed for stock. The basement may contain two rows of cattle stalls, with passage way between, six feet wide, with shoots leading to the upper part of the barn for delivering hay, grain, and other feed. This will leave a space 12 by 60, which may contain calf-pens and a place for sheep, and it may be so arranged by means of sliding doors that it may be entirely closed in inclement weather. This basement will contain stalls for thirty-two cattle, and the manure may be thrown directly into a cart or wagon and hauled directly where it is wanted.

This barn may, of course, be enlarged by adding on, to accommodate any required amount of stock; but, if a much larger barn than this is wanted, the square or octagonal form should be used. It will give largely increased room in proportion to the cost.

A Common-sense Barn.



MAIN FLOOR OF DAIRY BARN.

Above we give an outline of the basement of a barn forty feet wide and sixty feet long, with a lean-to overshot extending twenty feet in front.

This barn will contain about 100 tons of hay. The barn would be better facing the South if the lay of the land as to declivity will allow. The hay-house may extend twenty feet in width and height in the form of an L and of such a length as may be wanted for storage, say forty feet This barn, if the space below the hay-house is utilized, will stable six horses and forty cattle.

The basement of the main barn may be divided into stabling as follows. A, horse stables 12 feet deep, with mangers two and a half feet wide for hay, with suitable troughs for grain and manger for hay. B and C are cattle stalls. Those in B hung with swinging gates, opening side ways, C the same, but each stall having a separate gate entering direct from the yard. E is the main entrance eight feet wide and may contain feed chests; *e* is an entry five feet wide, with steps up to door D, and having an entrance into the horse stables at each end. F is the overshot or shed. G is the portion under the hay-house to be utilized in stalls, if the hay is not desired to run clear to the ground; and H is the yard connected therewith. If necessary this may be roofed over making additional shed room.

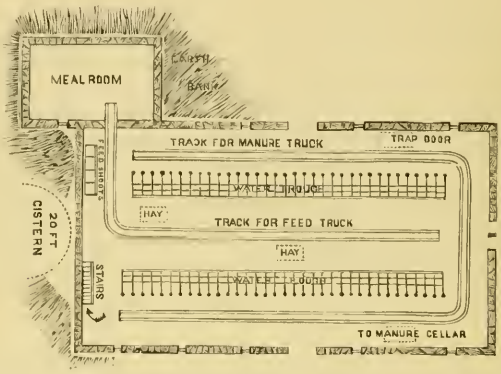
Square and Octagonal Barns.

In the square or octagonal barn the hay is in the centre, in which a vast compact mass of hay can be kept, and this will run from the basement to the peak. The basement will be used as a stable, and if desired the main floor may also be so used; modern builders understand perfectly the art of making a floor proof against the leakage of liquids.

One especial advantage in the octagonal shape for barns, when a large number of cattle are to be fed, is, the roof is easily supported and contains more economy of space for its size than any other form except the circular. In this the hay will be in the center, and the cattle next the wall, facing inwards. Above the cattle will also be a mow for hay, except such portions as are wanted for granaries, grinding machinery and other conveniences. At the peak may be a windmill of sufficient power to do the pumping of water for the stock, unless it be feasible to conduct water by its own gravity. In this case it may be used for grinding and cutting fodder.

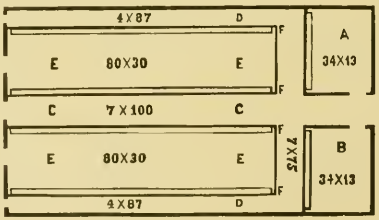
Let us see what an octagonal barn sixty feet in diameter will hold. The width of the stable will be twelve feet, and the feed next the hay six feet, making eighteen feet in all. This running clear around will have a central core of twenty-four feet, besides the entire area, from the floor above the stock. The stable will be one hundred and eighty feet in circumference, and, allowing three feet, six inches to each steer, will accommodate fifty head of steers, or if cows, a still greater number.

Below we give the plan of the dairy barn which will explain itself. We have represented a cistern and also the meal room, protected by an earth embankment, so it may be used for roots and other feeding material that would be injured by freezing.



PLAN OF STABLES IN BASEMENT.

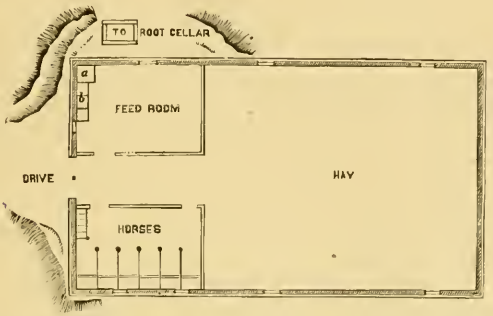
The following diagram will show a compact basement for a Bank Barn for feeding cattle and also accommodating a limited number of horses and milch cows, to be seventy by one hundred feet square.



CATTLE-FEEDING BASEMENT.

A is the horse stable with six stalls; B, cow stable for six or eight cows; C C main entry; D D two small entries, running on either side of the

cattle stables; E E E E are the cattle stables, 80 by 30 feet each; and if the cattle are placed 4 feet apart, will accommodate forty head of steers for fattening.



MAIN FLOOR OF DAIRY BARN.

To show another plan we give a diagram of a dairy barn fifty by one hundred feet. In the plan of the main floor *a* is a ventilating shaft, and *b* feed shoots to basement through trap door which will be shown in the plan of the basement.

A Square Cross Barn.

For a large number of cattle we know of no better form than a square barn for the center, with four wings running therefrom, each 30 feet wide by any desired length. In this arrangement the cattle might be placed with their heads to the wall, leaving a passage-way between each two rows, by which the manure might be taken up and carried away in carts. In some parts of the West cattle-feeding is carried out on an immense scale. Feeders are already beginning to ask, how best they may build stables to save cost in feeding, and at the same time place the cattle in the best possible position for economical feeding.

A writer in the *National Live Stock Journal*, under the signature of "Alimentation," gives data for a barn to feed 1,000 head of cattle. The principal objection to the plan is the concrete wall advised for the basement. In a building of this size and weight, it will be found to be quite unreliable in the West. The basement should be built of good solid stone, or the best hard burned brick. In lieu of this, if concrete must be used, the weight of the building should be on stone piers. The details

for building the barn are given as follows, the wings being 30 feet wide and 200 feet long:

"This square cross barn will have all its extreme parts equi-distant from the center. It will be the same distance from the quadrangular center to the extreme animal in either wing as from the octagonal center. By doubling the width of the wings, we dispense with eight long sides 200 feet each, or 1,600 feet; and as the ends of the four wings are the same length as the eight wings, the saving in outside wall is 1,600 feet. And if these sides are 20 feet high, and boarded up and down with a two-inch batten, it will take 36,933 feet to cover these sides thus dispensed with. It will also save all the outside and interior posts of the four wings dispensed with, as it will require no more posts in a wing 60 feet wide than in one 30 feet wide. This will make a saving of about 22,000 feet; and the outside sills and plates on these long sides will be saved, amounting to 24,000 feet, besides girths and braces — amounting in all to a saving of 100,000 feet. The roofs and floors will cover the same number of square feet as in the eight wings, and cost about the same.

WINTERED WITHOUT SHELTER.

WINTERED WITH GOOD SHELTER.

"It would also save 14,400 cubic feet of wall. The whole saving by building the wings 60 feet wide could not be less than two-fifths of the whole cost of the barn; and the convenience and economy of labor must be even greater than with the eight narrow wings. This square cross barn has the capacity to feed conveniently and comfortably one thousand head of cattle; and it now remains to notice some of the details of construction.

"The quadrangular center, 60 feet in diameter, may be built with large corner posts, say 14 by 14 inches square, 37 feet long, and the plates and girths of the wing may be framed into these posts; but it probably would be better that the wing should have separate corner-posts, and they be bolted to the posts of the center. The quadrangular center should be high enough above the wings to clear the ridge of its roof. This would require the posts of the center building to be 17 or 18 feet longer than the wing posts, as the ridge of the wing roof should rise at least 17 feet in 60 feet, and come up under the cornice of the center building; as these wings will cost about the same money with posts 20 feet, and the latter height will hold about 40 per cent more, and as this storage room will be wanted for so many animals, it will be better to provide room in abundance, and make the posts twenty feet long.

"The floor in the wing above the basement will run lengthwise of the building, and it will be 16 feet wide, so that the posts on either side of the floor, running up to the cross-beam over the floor, may stand on a sill running lengthwise over the basement, and eight feet from the center, supported by the stanchion timbers. These two sills will be strongly supported the whole length by the stanchion posts, placed only 38 inches from center to center, and will consequently hold the whole interior structure above. The bays on each side of the floor will be 22 feet wide; there will be no loss in so wide a floor, as the hay may be mowed one or two feet upon each edge of the floor if more room is desired. There will be 42 bents, the outside posts being about 18 feet 2 inches from center to center. The top of the cross-beams, running from side to side of the barn, will be 13 feet above the sill, and will be spliced at the post, or between the posts, on either side of the floor. On three of the bents the cross-beams should be carried up nearly to the plates, and the posts at the side of the floor must also be carried up to support the beam. The three bents (every third one) will tie the barn together, and being so far apart, will not obstruct pitching with a horse-fork. These high beams, besides being pinned to the outside posts should have a stirrup around the post coming back ten inches upon the beam, with a three-eighth inch bolt through the stirrup and the beam, turned up tight with a nut, and if the beams are well spliced in the middle, this will hold the barn firmly from spreading at the plates. Now, to prevent this long wing from rocking or swaying by a strong broadside wind, these bents with the high beams should have a long stiff brace running from the foot of the post on the side of the floor to the outside post just under the high beam. Such a long brace on each side will hold the barn rigidly from rocking. And while speaking of braces, let it be remembered that a brace is valuable just in proportion to its length. The braces from the outside posts up to the plates show a four-foot run. They will assist very much in sustaining any weight upon the plates.

"It is not intended to have any purlins in these wings to support the roof, even though they be 60 feet wide. The brace on top of the beam will have a run on beam from post of 8 or 9 feet, running up the post just under the plates and fastened by a bolt. This will hold the plates absolutely rigid, and the roof will not spread them. The rafters should not be placed more than two feet apart, and the collar-beams should be 1 1-4 by 5 inches, and placed six feet below the ridge, with every other pair of rafters double collar-beamed; that is, with a collar-beam nailed upon each side of the rafters. This will make a strong shingle roof. The collar-beams will be some 20 feet long, and will be about as good a support to the roof as purlin-beams. The collar-beams should be as high as the

barn would be likely to be filled, so that no room will be lost, and the barn will be practically free from obstruction to pitching with a horse-fork.

"In the bents, where the cross-beams are raised nearly to the plates, there must be a beam framed into the posts on each side of the floor, 13 feet above the sills, to correspond with the other beams over the floor, upon which scaffolding may be placed for using the room over the floor. It remains only to be mentioned that the interior sills are four cross-sills, 10 feet apart, to tie the barn together at the bottom, and two sills running lengthwise, one on each side of the floor—that is, the centre of each of these long sills is placed 8 feet from the centre of the barn. The joists for the bays will run from these long sills on each side of the floor to the outside sill—about 21 feet. Each of these long sills come over a row of stanchion timbers in the basement below."

FARMER THRIFTY'S CATTLE.

The reader will see that these wings above the basement are built in the simplest manner, using no surplus material, and as cheap as may be consistent with strength and durability.

Basements for Cattle.

"We will now examine the construction of the basements of these long wings. The wall under each of these wings, if built of concrete, 15 inches thick at bottom, 12 inches at the top and eight feet high, being 460 feet long, would contain 1,110 cubic feet, and could be built in most

places for 10 cents per cubic foot, or $414 per wing. The wall under the center would be 1,440 cubic feet, and cost $114. The wall under the entire square cross barn would cost $1800. The long sides would require something to stiffen the wall sidewise; but a pier built against the wall on the inside would be in the way, and on the outside would look unsightly; so to avoid the necessity of such piers, let a T be made of strong iron, say three-fourths by two inches. The long end of the T would be about 20 inches, and built into the wall, and the cross lie across the top of the wall directly under the sill. The end of the T should project beyond the sill on each side far enough to have a three-quarter inch hole punched, into which to insert a piece of the same flat iron, six inches long, rounded at one end. This will attach the wall to the sill. There should be four of these T's for each side—one near each cross sill 40 feet apart. This will hold the whole wall to the beam, and prevent any swaying. These long sides will give room for inserting

FARMER SLACK'S SHELTER.

plenty of windows for light, the frames being into the boxes, and the concrete built over them. The sash may be hung on a pivot in the centre, so as to open easily to give ventilation at certain seasons; but the fresh air should be introduced through the wall near the bottom, through hard burned earthen or pottery pipes, 15-inch bore, just long enough to reach through the wall. These pipes may be laid in the boxes, bedded in the concrete, and the concrete tamped down upon them. They may be placed ten feet apart, and will not weaken the wall. Close covers may be fitted to the inside, so as to shut them out at will; and with proper ventilators

to discharge the heated and vitiated air through the upper part of the barn, there will be a constant circulation of fresh air through the basement.

One other point must be mentioned in reference to the wall. A concrete wall contains a large amount of moisture, and if the sills are to be placed on before the wall becomes quite dry, which is usually the case, the moisture will pass up into the green timber of the sill, form a coating of lime on it, and prevent the sap from escaping, and the result is a rapid decay of the timber. To prevent this, take well-seasoned pine boards, 12 inches wide, coat one side with gas tar, and bed this tarred side in the mortar on top of the wall. The sills are laid on this leveled board, and no moisture can come through this board into the sill to rot it.

Arranging the Basement.

These long stables must be laid out so as to render the labor as convenient as possible. There must be easy access to every animal in the stable, and this becomes more important when one thousand cattle are to be provided for. Cattle are most easily attended when placed in double rows with their heads turned towards one feeding floor.

In the long basement, the first row of stanchion posts will be placed seven feet from the first wall, on the side of the first feeding floor, 14 feet wide. On the other side of the feeding floor is the second row of stanchion posts, coming up under one of the long sills, as described before. Two and one-half feet being occupied by mangers on each side of this floor, will leave nine feet for a drive-way. Along this floor may pass a cart or wagon, with green food in Summer, or fodder in Winter. The third row of stanchion posts will be 16 feet from the last, under the second long sill, on the side of the second feeding floor; and the fourth row will be fourteen feet from the third, on the other side of the second feeding floor, and seven feet from the other wall. Here two rows of cattle stand, with their tails to the walls, and the two middle rows stand tail to tail, facing upon opposite floors. The largest animals should be placed in middle rows, as there is the most room. These stanchion posts are placed 3 feet 2 inches from center to center, and the cattle are best fastened to the center of a chain stretching from staple to staple driven into each stanchion post. These chains slide up and down on staples. The mangers may be placed 20 inches from the ground, and, with long staples, the cattle may lie down comfortably. One of the best ways to feed cattle, with plenty of bedding and muck for deodorizing, is to let them stand three or four months on tan manure, and, the mangers being placed high, the manure may accumulate two feet deep under them, and they may keep quiet clean, with the bedding and muck, and the manure

will be trodden so hard as to ferment very little. When a lot of cattle are sold, then wagons may be driven through to carry off manure. I have seen cattle fed in this manner, carded daily, and kept quite clean, standing on their manure for four months.

These feeding floors, as described, stretch through the whole length of the barn. A feeding car passes through two wings, and, having a turn-table, may pass through any wing. Feed may be dropped through a chute on the side of the upper floor into the car wherever placed on any feeding floor. This form of barn gives every facility for cutting and cooking the food—a larger engine, placed in the center, cutting, grinding and cooking all the food; and this also offers the best facility for soiling three thousand head in Summer, if such should be necessary. In the West, however, where only the feeding of such large numbers of cattle would be profitable, soiling is out of the question.

Adapting Means to the End.

No person can possibly know so well what an individual wants as himself, if he be a reflecting man. The architect scarcely ever gives attention to the planning of barns. The best barns in a country are those of intelligent farmers who have carefully observed the conveniences of various kinds in the barns of their friends in the localities visited, and who when in building their own varied them to suit their own wants. For this reason we have simply given outlines of those illustrated with descriptions of others adapted to various numbers of cattle. See pp. 588, 590, 591. To give the cost would be a waste of space that may be better employed. This will vary with locality and the price of material, and any master carpenter or mason will quickly estimate them. As a rule, the elaborate and well furnished structure is not the most convenient one, but those which have the greatest number of permanent conveniences, and in which the space is most thoroughly economized. Hence within the last few years, or since the general introduction of improved machinery, farm barns have undergone a complete change in the manner of construction.

Formerly barns were comparatively low structures where everything had to be done by manual labor; it was not economy to pile up hay, grain, or other farm produce, story after story; the labor of lifting, or carrying did not pay. Since the invention of hoisting machines and hay carriers, the invention of modern windmills, grinding mills, horse powers and other labor-saving machinery, twenty-five feet posts are not unusual, and no barn should be built of less than two stories.

There are few farms where the drainage is so poor or the land so level but that a declivity sufficient for a basement barn may be had, by throwing the excavated portion up to assist in forming the trackway or rise to the main floor. Windmills are now so nearly automatic in their working that they may very safely be trusted to pretty much take care of themselves. Therefore, in all the more pretentious farm barns, they should be built with special reference to the erection of a windmill on top. This may be used for a variety of purposes, cutting fodder, grinding grain, pumping water, being its principal work. If the water is collected in a reservoir in the center of the mow it will not freeze, and the pressure will always be equal, and thus the water may be carried in pipes any distance, to the house or the dairy, and become a most valuable economy.

In the building of barns of superior size we have given descriptions of all but the circular barn, which can hardly be called a practical or economical structure, and the octagon barns will come under the same category; for while economical in respect to space, they are more costly to build, if for no other reason than that they are unusual. We therefore recommend the square barn in every case when the width is to be forty or more feet, with not less than twenty feet posts. This, with the the basement, will give two or three stories as necessity may require. The basement of course will be used for the stables, and if additional room be needed one or two wings may be added, and when farther space is needed two more. The diagrams showing the internal arrangements may easily be obtained to suit such a structure while pursuing the general features of economical and labor-saving utility.

Summer Shelter.

While the question of Winter shelter is of the first importance, it is necessary that Summer shelter be provided, and also for protection against the inclement storms of Spring after stock has been put upon pasture. During the feeding season the sheds and barns will suffice; before pastures are flush the Winter shelter can be utilized, for some food must be given night and morning. During the prevalence of storms the stock will of course be kept up and fed. Later, however, it will not be found practicable. What is wanted is a range where stock may not only be secure from the winds of driving storms, but where they may retire for shelter during the extreme heat of Summer days.

We do not believe in shaded pastures. They are poetic but not practical. The object in keeping stock is to make them eat as much as possible. The pasture should be devoted to grass. If shaded by single trees here and there, stock will very often haunt these when they should be

feeding. While in motion in the act of grazing they do not suffer from heat. Therefore it is better that they be obliged to do some travel to reach the shade, and this shade if natural will generally have water near. If not, the artificial shade should be given at such places where water may be had from mills or ponds most cheaply.

A PASTORAL SCENE.

The accompanying cut will show how this artificial shelter is accomplished both by isolated trees in the pasture and by clumps and groves in the distance. As previously stated, the single trees we condemn, and they have been introduced to illustrate the point, and at the same time give effect to a most pleasant pastoral scene, and which any farmer may obtain in a gently undulating country.

Where to Plant Shelter.

This shelter should be planted along the crest of ridges, about gullies and ravines, and in fact wherever the soil is not adapted to cultivation. These points will be especially sought during the heat of Summer, and the timber will eventually more than pay the cost of planting in any prairie country. All high points are generally free to a great extent from biting insects. The ravines will afford shelter from winds and driving

storms, and also will be valuable as places where permanent water may be had either naturally or artificially by draining. In lieu of this plant shelter belts and groves near the low places where water may be had, or near natural water holes on the farm.

What to Plant.

For dry soil, anywhere south of 42 degrees, the Catalpa (*Speci osa*) will be found hardy. The variety *Big nonioides* is not hardy in the West north of about 38 degrees. Black walnut is valuable, so are all the maples, the cotton-wood does well almost anywhere, and if care is taken to procure cuttings of the male variety, (this tree bears male and female flowers on separate trees), you will have no trouble with the blowing about of the cotton during seeding time. Evergreens may be planted almost anywhere if the soil be moderately dry. The Norway spruce is most valuable, and next to this the white pine. For low lands, cotton-wood, the soft maples, and the white, the black and the golden willow will be indicated. Thus the farmer will find that this question of shelter, while one of the most important of the many connected with farm economy—the points relating to Summer shelter—will in the end prove one of the best paying investments in a prairie country of any in the whole category.

CHAPTER V.

HOW TO PASTURE, FEED AND WATER.

ABOUT PASTURAGE.——CLOVERS THAT DO WELL.——UNDESIRARLE CLOVERS.——ALFALFA.——THE TRUE GRASSES.——TIMOTHY, OR CAT'S TAIL GRASS.——BLUE GRASS.——RED TOP.——ORCHARD GRASS.——FOWL MEADOW GRASS.——TIME FOR PASTURING.——WATERING.——FEEDING STOCK CATTLE.——HOW TO FEED.——FEEDING MILCH COWS.

About Pasturage.

The subject of pasture and meadow is one of the most important with which the farmer has to deal. It makes feed in Summer and forage in Winter. Yet, in the United States, nearly all our meadows consist of one clover and one grass; in other words, timothy and clover are our great meadow plants, and the addition of blue grass to this forms the bulk of our pasturage, always excepting, of course, the vast areas of wild grasses that still cover the great prairies and vast plains of the West, yet to be brought into cultivation by man.

Until within the last few years, or until the dairy interest began to assume such gigantic proportions, farmers got along well enough with these; for, where stock raising for beef is the sole object, and wild grasses are plenty and grain easily raised, and consequently cheap, a very few grasses will suffice; but the impetus given to dairying within the last few years, has fairly shown that the best results, nay, that even fair success cannot be had with a few grasses. This the dairymen in New York State came to understand years ago, and yet so little was known of the adaptability of varieties to soils and climate, that our best farmers worked blindly in experimenting, and unfortunately, our botanists could do little more than furnish long strings of mere classical names of varieties as they were known in books, and could give almost no information as to their adaptability.

Clovers that Do Well.

Practically, the clovers are confined to three species. First, red clover, natural to all soils that are adapted to the cereal crops, as wheat, rye, barley, oats and corn, or such rich soils as do not heave under the frosts of Winter and Spring. If so, clover is apt to be thrown out, or at least to be so heaved as to be practically worthless, especially so from the fact that it is really a biennial plant; that is, dying out at the end of the second year if allowed to seed.

The next clover in general use is Dutch, or white clover. This does well on soils somewhat moist, although it will not stand flooding. It is not especially relished by cattle, and at some seasons is apt to give horses what is termed the slobbers; that is, it causes them to form saliva to such a degree that it drops from the mouth freely. Cattle do not relish it, and it can hardly be called good feed for horses. A small portion of it in a permanent pasture does not come amiss, yet it is so natural to many soils that, like the plantain, which the Indians have termed the white man's foot, white clover they have called the white man's grass.

The only other variety of clover that we can recommend for cultivation, is Alsike, sometimes called Swedish clover. This does well on moist land, and even bears some flooding. We consider it the next in value to red clover, and altogether better pasture than white clover. It also makes good hay on soils too wet for red clover.

Undesirable Clovers.

There are a number of other species of clover, some of them indigenous to the West, which we only mention as a caution against their being sown. These are; two species of so called Buffalo clover; the upright and the running Buffalo clovers; the upright or yellow clover; and the low hop clover, a half-creeping variety. There is only one more variety worth mentioning, and this simply as a warning to farmers not to sow it, except for bee pasturage, and then only when it may not become a troublesome weed. We have reference to the tree clover or Bokhara clover, specifically the white-flowered melilotus. It has been recommended as valuable for soiling; that is, for cutting green for feeding to stock in stables. We give the same advice about sowing this clover that the crabbed lawyer did to a young client who asked his advice about getting married—*Don't*.

Alfalfa.

The case is different with alfalfa, the Spanish name for a plant known botanically as *medicago*, and, in English by its French name Luzerne.

This is valuable in soils adapted to it, deep dry soils not subject to hard freezing in Winter. In California it has become one of the standard forage crops. In some of the far west plains country it will undoubtedly be found to stand well, as it will in Texas and New Mexico. In South America, in the vast grazing region, it has become thoroughly naturalized, and is well worthy of trial wherever the Winters will not be too cold for it, say south of forty degrees north latitude.

The True Grasses.

It is to these that we must really look for our pasture plants, outside the few clovers we have mentioned. It is a vast, as it is the most important of plants to man, comprising some 230 botanical genera, and not less than 3,000 species, and includes all our cereal grains, as wheat, rye, barley, oats, corn, etc.

It would not be in place in this work to enter into a history of grass, and the characteristics of the several species, valuable as they may be. Our readers must therefore be content with a list of some of the more important varieties, as they have been tried, and their seasons, and some of their characteristics; and this more for their value as pasture than hay, and for reasons previously given.

Timothy, or Cat's Tail Grass.

The first in importance is timothy; a better name, as more perfectly describing its characteristics, would be cats-tail grass, by which it is known in England. It does well in all clayey or clay loam soils that are not too wet, and makes the best hay of any of our grasses. For pasture it is among the least valuable, if we except cattle, since one peculiarity is that just at the ground it forms a bulb, which if bitten in close grazing, as horses, sheep and hogs are apt to do, it dies. It is also a grass that will not bear hard tramping.

Blue Grass.

This is the great pasture grass of the Western States, in its two varieties, Kentucky blue grass, which flourishes best south of forty degrees north latitude, and wire grass, which is found well up into Wisconsin and Minnesota. Here again is confusion of common names. In Pennsylvania it is called green grass, and this is really a suggestive name. It really remains green early and late, longer than any other of our cultivated grasses.

Blue grass forms a tough, firm sward, springing early in the Spring,

growing late in the Fall, and holding its substance well in the Winter. So that after being pastured in Spring if allowed to grow on through the Summer and Autumn, cattle and other stock may be wintered on it admirably, when deep snow does not cover the ground. Both varieties are found in their best perfection in limestone soils, although they do well according to latitude on all strong, rich, and even on some rather thin soils if well drained. Neither variety is adapted to wet soils. It cannot be called a hay grass, its great value being for pasturage.

Red-Top.

The next grass in importance, because found to do well on a great variety of soils, is red-top. It makes good hay and is valuable for pasturage. It should be more generally cultivated than it is, being adapted to a very considerable range of soils, neither very wet nor very dry. As before stated, in Pennsylvania this is called herd's grass, and we may add in Rhode Island it is known as Burden's grass. While red-top has a goodly range of soils to which it adapts itself fairly, it does best on a rather moist soil, flowering rather late, or about the same time or later than timothy. It dries out considerably in curing into hay, and is not very rich in sugar, gum or starch, three important elements in feeding. It is a strictly perennial species, and forms a pretty dense sod, when well established.

Orchard Grass.

This is really one of the most valuable grasses for extensive trial as a first-class pasture grass in the whole list of cultivated grasses. The wonder is that a grass so generally regarded as excellent in Europe, should have made its way so tardily in this grass country. This is probably from its habit of growing in tufts where sown thinly. It is one of the earliest of the grasses to start in the Spring, is strictly a perennial, starts freely after being grazed or mown, and if sown thickly makes excellent hay. It thrives better than most of the grasses in a partial shade, and hence its common name, orchard grass.

For pasture it should be sown at the rate of not less than two bushels of seed per acre,—three bushels is better. It is very light, weighing only fourteen pounds per bushel. When sown for hay we have had excellent success by seeding at the rate of sixteen pounds of orchard grass, and ten pounds of clover per acre. It is excellently adapted to sowing with red clover, since it blossoms more nearly with clover than almost any other of the grasses.

Fowl Meadow Grass.

This is another most valuable grass, considered especially so for hay, and to our mind quite valuable for pasturage, particularly for dairy stock. Like prairie hay it is quite free from dust, and at the same time it possesses all the essential elements of nutrition in a high degree. In all new countries the first dependence must be on the wild grasses. The real difficulty is, farmers do not undertake the cultivated grasses until forced to. If a trial of the important varieties here noticed shall lead to the testing of still other sorts, the time will soon come when our farmers will wonder how they could have gone on so long without appreciating at their true value many varieties, that the aim and scope of this work precludes even the mention.

Time for Pasturing.

It is important that cattle be not only fully fed but that they have their feed at regular intervals. Where stock are driven to and from pasture they should be turned on soon after daylight in the morning, and not taken out until sundown. It is especially necessary that they get the grass while yet it is covered with dew. So, where stock are kept and fed in stables, the first feed should be given early in the morning, just what they will eat clean. This should be supplied not less than three times a day; and at night, to insure full stomachs, some extra feed as meal, shorts, etc., should be added.

Salt should be kept where the animals can get it at will. They will thus get enough for their wants, and just as they want it, and will eat less than where supplied at the stables, or out-of-doors, at irregular times. Irregular feeding of salt is one of the worst possible practices. Salt is a cathartic when given in large doses, and this danger should be avoided.

In Winter, whether the animals are kept in stables, in sheds, in feeding-yards or in the shelter of groves, the same regularity of feeding should be observed. Stock should also be graded, if possible, so there will be no very strong and very weak ones together. And those of a given age should be fed together. Where animals are fed in groves or in fields a much larger, and, in fact, more irregular drove, as to age and strength, may be kept together, than under open sheds or in close feeding-yards. Feed early always, as soon after daylight as the animals can see to feed, and let the last mess at night be given so as to be well finished just before dark. When fed in stables the same rule should be observed. Early and late feeding of good fodder, and in such quantities as they will eat tolerably clean, is what keeps growing animals going right along. This

is what the wise feeder seeks, for thus he secures the best possible gain, with the least loss in daily natural waste of the physical system.

Watering.

Whether it be Winter or Summer, it is absolutely necessary that cattle have an abundance of water. Without this, given at regular times, there can be no profit to the feeder. Cattle may be driven to it twice a day, if the conditions are such that they cannot be fed in the same range where the water lies. When cattle are kept in stables, it is altogether better that the water be conducted there in pipes so as to run directly into their drinking troughs. It will be found cheapest in the end. If there is no living water, do not depend upon holes cut in the ice of ponds. It is not only dangerous to the cattle, but will cost more in the end than any other plan of watering. If the water is to be taken from wells, or ponds, erect a good windmill, with suitable tanks, with pipes so they will not freeze, leading to ample troughs. Let these be in the yards where the stock take their rest, or else in the feeding range. Then see that they have plenty of it, and plenty of salt where they can lick it at will. If the cattle are to be fed out-of-doors on ear corn and hay, see that proper troughs are provided for corn and racks for hay; let them be large and ample. Where this is done, close yards should be provided with warm shelter and water.

Feeding Stock Cattle.

In wintering stock cattle the main dependence will be hay or corn fodder. These, if good, are perfect food, that is fed together, or hay fed alone will keep cattle growing, if they do not suffer from the cold. In feeding the same rule should be adopted as in fattening cattle. See that they are not given enough to waste, but do not force them to eat rough, coarse, stalky or weedy hay clean. No animal ever did well on food it did not like. To make money in growing cattle they must not go hungry Winter or Summer. If the fodder is prairie hay see that the best and softest is reserved for the calves, and next best for the cows. The oxen and steers will do fairly well on hay somewhat coarser.

How to Feed.

Calves should have some grain daily; oats are best, one quart each, or the equivalent in other grain. Cows expected to calve the succeeding Spring, should have from four to six ears of corn daily, or its equivalent in some other grain; and oxen when not working, about the same.

When working, give the same as to a fattening steer, or about a half bushel a day.

Cattle intended for fattening the succeeding year should have especial care the previous Winter. They should have feed enough to keep them growing right along, say about half the quantity of grain given to fattening steers, that is, allowing the feeders do not believe in forcing the animal from *calfhood* constantly, until ready for the butcher. The best and most successful feeders do force, and none that we know who have ever tried it could ever be induced to go back to the old way of letting stock make a gain in Summer, to lose half or more of it in Winter.

Feeding Milch Cows.

Whatever the plan of feeding or sheltering cattle for the butcher—of course, fattening cattle will have more attention given them, so far as food, water, and shelter are concerned—milch cows *must* have soft food. No dairyman ever made any money by feeding cows in milk on dry hay, ear corn, or dry grain; for cows it must be ground.

In feeding, the owner will, of course, be guided by the relative value of food in the market. If possible, a little ground oil-cake should form a daily portion, about half a pound per cow. In all the West, corn-meal is the cheapest food, except in the neighborhood of large merchant flouring mills. One great difficulty with corn-meal is it is heating. It should be fed almost measure for measure with bran; ten pounds of this with the addition of half a pound of ground oil-cake, with plenty of good hay, will be liberal feeding. If the cow will eat fifteen pounds of meal and bran, it will be wise economy to give it to her. She will not eat so much hay, and in a corn country hay is dearer than corn, and as a rule an acre of corn is raised fully as cheap as an acre of hay.

CHAPTER VI.

BENEFITS OF KIND AND CAREFUL TREATMENT.

FEEDING FOR PROFIT.——AS BETWEEN WELL AND ILL KEPT STOCK.——HEAVY WEIGHTS.——PROFIT IN EARLY MATURITY.——MAKE BEEF YOUNG.——BABY BEEF.——FEEDING; COST IN ENGLAND.——SUMMER FEEDING.——ANIMAL WASTE.——ANIMAL HEAT.——ADVANTAGES OF SUMMER AND WINTER FEEDING.

Feeding for Profit.

It should require no argument to show the benefits of kind and considerate treatment in the rearing of live stock of any kind, and in the treatment after they become mature. One reason why so many persons fail to be successful in fattening stock is that they do not use due consideration in their treatment. The man who kicks and clubs his stock, or allows his hired help to do so, never yet produced a prize steer, and never will. Obesity and activity do not go together, neither will undue excitability allow of a steady increase in fat. Hence the feeder, for the sake of his pocket, should see that fattening cattle are kept entirely quiet. To insure this the sagacious breeder avoids not only cattle naturally irritable, but those raised by persons of known bad or brutal temper. We have known a stable of cattle thrown off their feed for days by a sudden fright. Those frights are quite apt to occur from the slightest causes. Where strange cattle, raised half wild, are confined together—and this is not rare among stock that have been picked up indiscriminately,and what are known as woods or prairie cattle—the first effort of the sagacious feeder is to get the confidence of the stock. This is only accomplished by gentleness, not by any means inconsistent with firmness. The cattle must know and obey their master. Their knowledge of him must be that they receive food and kind treatment at his hands, and not stabs with the

fork, nor beatings with the handle, or kicks, because they happen to stand within reach of some brutal feeder. The inference is that the humane man is apt to have humane help; the brutal stock man will have brutal help, and the stock will be very apt to partake of the character of their master.

As between well and ill-kept Stock.

Aside from some wealthy professional men, having suburban farms, stock is kept solely for the profit it will bring. The stock of amateurs are not only carefully housed and fed, but they are kept at the height of perfection, so far as costly appointments and careful grooming is concerned. The practical man arrives at the same results in a different and cheaper way, but none the less certainly. His shelters may be of the most homely kind, even made with poles and slough hay, but are warm and comfortable. He cannot afford iron mangers and water pipes through his stables, but his troughs are tight and solidly built, and his animals are regularly fed and watered. He will not have blankets in winter and sheets in summer, but his animals will be well and carefully fed, and sheltered from the earliest age until ready for sale.

The humane man will get ten dollars more for a cow because she will be gentle and well trained to give down her milk without resistance. His steers will bring from one to two cents per pound extra in market, for the reason that the constant care given them will have resulted in extra weight and condition. Let us see what two cents per pound amounts to. His steer of a given age, say three years, is fed from birth so that it has never fallen in condition, but has constantly gained, and will weigh from 1300 to 1600 pounds, according to the breed. The steer of the man who does not believe in feeding nor properly treating his animals, will weigh off of grass 900 or 1000 pounds. The good feeder will get five-and-a-half cents per pound gross weight, or $71.50 for the 1300 lb. steer, and $88 for the heavier one. The poor feeder will get, say three cents per pound, or $27 to $30. One may see this every day of the year at the stock-yards of our western cities. It does not cost $20 more to make the good steer than the poor one; so the enhanced profits are nearly $25 in the one case and $48 in the other; in other words, the good and humane feeder gets the enhanced price on the poor feeder's 1000 pounds, and on what he has put on besides by his considerate care and constant good feeding. We have partially shown this in another part of the work, in alluding to the daily animal waste. That is an integer. This animal waste may be produced excessively, whatever the system of feeding, if animals are subjected to frights and bruises, as well as by exposure to storms and lack of sufficient food.

Heavy Weights.

Until the inauguration of the Chicago Fat Stock Show, under the auspices of the Board of Agriculture of Illinois, very little reliable data could be had as to gain in feeding animals of various ages. It was well understood, however, that the young animal gained faster in proportion to the amount of food consumed, than the mature animal, and that the older and fatter the animal became, the less the daily gain. As showing actual facts we append the statements of exhibitors, sworn to in some of the more important classes shown there, and the reports of committee thereon:

"Among the heavy cattle were the following, and credited to weigh, as taken from the pasture and feeding yards, as follows: The steer Gov. Morton, 3,190 lbs; Burnside, 2,870; Hoosier Boy, 2,640; Nels. Morris, 2,840 pounds. The following are the actual weights as given by the committee, on animals 1 year to 4 years old:

Messrs. Graves & Co., one steer 4 years old, 2,445; one steer 3 years old, 2,060.

A. F. Moore, one steer 2 years old, 1,786.

J. D. Gillett, one steer 3 years old, 2,139.

Wing & Thompson, one steer, 4 years old, 2,240; one steer 4 years old, 2,166; one cow, 1,525; one cow, 1,610.

John B. Sherman, one steer 3 years old, 2,019.

J. N. Brown's Sons, one steer 2 years old, 1,446; one steer 2 years old, 1,449; one steer 2 years old, 1,636; one steer 2 years old, 1,316; one steer 2 years old, 1,246; one steer 1 year old, 1,338; one steer 1 year old, 1,249; one steer 1 year old, 1,193.

Dexter Curtis, one cow, 1,833; one cow, 2,042; one cow, 1,936."

In this, of the interesting facts shown, is the great weight attained by one, two and three-year-old steers, as well as the great ultimate weights attained by mature oxen, viz.: Best one-year-old, weight 1,338 pounds; best two-year-old, weight 1,786 pounds; best three-year-old, 2,139 pounds; and the heaviest 3,190 pounds. The crucial test in every examination being simply the value of the animal for the butcher. The records given below will repay the study, and the reports of the committees, as given, will show the points upon which the decision was made;

The committee on Short-Horn steers, 4 years old and over, make the following report on ages, weights, and gains per day;

CLASS A—CATTLE. SHORT-HORNS—THOROUGHBREDS.

[TABLE 1].

EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day in pounds since birth.
1. W. W. Penfield	2,035	2,500	1.22
2. W. W. Penfield	2,155	2,438	1.13
3. J. H. Graves	1,948	2,415	1.25
4. Wing & Thompson	1,598	2,166	1.36
5. Wing & Thompson	1,578	2,250	1.42
Average	1,861	2,358	1.28

The committee in their report on this ring say:

The ring was made up of a remarkably fine bunch of well-developed steers; all were uniformly fat, with flesh well distributed in the most valuable portions of the carcass.

The animals reflected great credit upon the States in which they were fed, namely: Ohio, Kentucky, and Illinois.

The first-premium steer was deep red in color, smooth and even throughout, with straight top and bottom lines; broad, deep loin, well filled out; round, smooth, compact barrel; short in leg, with fine bone and small head.

This steer excelled the others in the ring in having more good flesh on the back and loin, with a small portion of cheap, unsalable fat meat, with square, deep, symmetrical quarters, well covered down to the knee and gambrel joint.

The second-premium steer was a deep red steer of superior quality, and in choice condition for the block, and, in the main, as good as the first-premium steer, but was not as free from bunches of fat, especially on the rump.

The remaining steers in the ring, while worthy of special commendation, were coarser and older than the prize-winners, and not as well filled out in the shoulder and thigh, and were patched.

The first-premium steer was the youngest in the ring, and showed the largest average gain per day since birth.

The second-premium steer stood second in this respect.

SHORT-HORNS—THOROUGHBREDS. COWS THREE YEARS OR OVER. REPORT OF COMMITTEE.

The ring consisted of eight cows of unusual excellence as a lot, showing great difference, however, in the matter of age, type, form and mode of handling.

The aged animals were uneven, and carried too large a portion of meat of inferior quality; too gross; some were very badly patched.

[TABLE 2].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	Dexter Curtis	2,560	2,042	0.70
2.	Dexter Curtis	3,667	1,936	0.52
3.	R. K. & A. S. Brownlie	2,065	1,769	0.86
4.	Sam. E. Prather	2.731	1,833	0.67
5.	Sam. E. Prather	1,186	1,525	1.25
6.	W. F. Gordon	3.064	1,901	0.62
7.	W. F. Gordon	2,241	1,669	0.74
8.	Wing & Thompson	1,428	1,616	1.13
	Average	2,364	1,786	.81

The cows averaged over six years in age, and some were over ten years old. Some of the old breeding cows were very undesirable for the block, and the meat would not be rated as even medium.

The first-premium cow was a deep red and of the lot the finest in bone, head and neck, the smoothest and best proportioned throughout, with an extra well-filled fore and hind quarter. In the great depth and even distribution of solid, mellow flesh, straight top and bottom line, broad back, and thick loin, this cow excelled.

The second-premium cow was somewhat coarser in head and not as smooth or evenly fatted, and rather deficient in back and loin; otherwise as good as the first-premium animal.

SHORT-HORNS—THOROUGHBRED STEERS TWO AND UNDER THREE YEARS

[TABLE 3].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	J. N. Brown's Sons	845	1,636	1.93
2.	J. N. Brown's Sons	814	1,449	1.78
3.	A. F. Moore	953	1,786	1.87
	Average	871	1.624	1.86

The committee reported on this ring as follows:

This ring was composed of three very superior steers, showing unusual development and ripeness for age. In size, symmetry, and distribution of meat in the best cuts, they would pay the butcher the most profit, and furnish the consumer with the best quality of first-class meat.

The first premium steer was red in color, had the best back and loin of the three steers, and showed the greatest development for age. Was the smoothest steer, with smaller head and lighter in horn; small, neat, short neck, with the widest and deepest breast; better in width of back and

thicker in loin. This steer was smooth and free from bunches, with firm, solid and mellow flesh. The quarters were heavy and well proportioned and well filled down to knee and gambrel joint. The shortness in leg and the fineness of bone is worthy of special mention.

The second premium steer was a rich roan, not as evenly fatted as the first premium steer—more uneven top and bottom line than the first premium steer.

STEERS THREE AND UNDER FOUR YEARS.

[TABLE 4].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	John Sherman	1,311	2,019	1.53
2.	J. H. Graves	1,335	2,060	1.45
	Average	1,326	2,039	1.53 1-2

The committee's report on this ring is as follows:

"This ring consisted of two very superior, well-developed and evenly-matched steers in point of age and weight.

The superior quality of the flesh and the proper distribution of the meat in the best parts of the carcass was particularly noticeable in both steers.

The first premium steer, a light roan, was perfectly smooth and free from bunches, and a good handler. He was straighter on the back than his competitor, with better hind-quarters. This steer was a low blocky, heavy-set steer, short in leg, fine bone, neat head, well cut up under throat, short neck, broad and deep in brisket, broad, straight back, heavy loin, with thick round, well meated down to the knee and gambrel joint.

The meat was firmer and more solid than on the first premium animal, which was fatter, and from all appearances would cut to better advantage and furnish meat of a superior quality.

The second premium steer was an extra well fatted red steer of great merit; was rather more leggy and coarser in head and bone than the other steer."

Profit in Early Maturity.

In the foregoing reports it will be noticed that the best gain was in steer one year old and under two; the next best gain was in steer two year old and under three, 1.93 pounds per day; the next best gain was in steer three years old and under four, 1.54 pounds per day. Then

in following the gain in cows over three years old, the average will be a diminishing quantity, until in the case of the cow ten years old, table 2, No. 12, the daily gain is but 0.52 of a pound; and in the case of the oldest steer, nearly six years old, table 1, No. 2, the daily gain was 1.13 pounds per day. These great results were arrived at by warm shelter, careful feeding, and as careful care from birth—most potent factors in any case when money is to be made in cattle, either for beef or the dairy.

As a rule, a yearling, as it is ordinarily wintered, will weigh much less in the Spring than in the previous Autumn. The next Spring and Summer it must first regain the flesh lost, and then add to growth and weight. The next Winter it again loses flesh, and at two years old often will not weigh as much as it did at eight months old. So it goes on gaining a little in Summer and losing as constantly in Winter, until at the end of the fourth year the animal will weigh 1,000 pounds—less than the same animal would have been made to weigh at eighteen months old with good common shelter and feed. There are cases in new countries where feeding, except hay, cannot be had; where this is plenty, and the range good, cattle may be raised at a minimum cost—simply salting and herding in Summer, and feeding in Winter. Here again the question of shelter must be considered and will be found to pay, and without which no profit can be realized.

This system of feeding, however, is no longer feasible except in limited areas. The great West is fast settling up and increasing in wealth. Herds are yearly improving through attention to breeding and feeding—the result of the cultivation of vast areas in corn, the seeding of meadows and pastures, and in superior buildings for wintering stock. The history of the thickly settled portions must be the history of the newer regions in the future. The profits, in farming in the West, are in the stock sold. Pastures and meadows are the groundwork of good farming everywhere. Thus verifying the Belgian maxim: No pasture no cattle; no cattle no manure; no manure no crops.

Make Beef Young.

The time has gone by when it would be believed that an animal must reach the age of four or five years before it could make good beef. The time has also passed when the mere tallow in an animal would sell it. The reason why we have so little beef fit for export to the English market, and which will bring in Western markets from five to six cents per pound gross weight, is that very few western farmers have adopted the English standard of forcing a calf from the time it is born until it is killed, the age never exceeding three years. This tendency of English breeders and

feeders has been the growth of years. They had first to combat the idea that beef must have age before it could be healthy meat. First, they compromised on three years; the beef was pronounced good. Then the cattle were pronounced at thirty months fully as good and ripe: they also found that they got enhanced profits from this manner of feeding. Then two-year olds were forced to the same weight that had previously been attained at three years. Last year beef from eleven to twenty months was sold, and from an article prepared by Mr. Henry Evershed, for the *Royal Agricultural Journal*, in which the experience of some eminent farmers given, we find interesting matter in relation to very young beef, or, as they term it,

Baby Beef.

Among others, Mr. Stanford, of Charlton Court, is credited with having sold the following heifers and steers in 1878, the animals being high-grade Short-Horns, at ages and prices given below:

	Price.	Return per month from birth.
One eleven-months-old steer	$ 74 00	$6 73
One thirteen-months-old steer	101 64	7 82
Three fourteen-months-old heifers, average	92 40	6 60
Three fifteen-months-old heifers, average	101 64	6 77
One sixteen-months-old steer	102 30	6 39
One eighteen-months-old steer	115 50	6 42
One eighteen-and-a-half-months-old steer	129 36	7 00
Two eighteen-and-a-half-months old steers, average	122 10	6 60

The weights of these, some of them were calves, is not given, but the price is stated at from 16 to 18 cents (our money) per pound, net weight —meaning, we suppose, the four quarters. The best 16 months old steer must have weighed something like 1,200 lbs. alive, allowing the quarters to have been 65 per cent. of the whole weight—a not very large allowance for such young cattle. In the last Chicago Fat Stock Show, the best steer, 28 months old, weighed 1,636 lbs. The best steer one year old and under two 1,338 lbs., showing that our best feeders not only show fully as early maturity as English feeders, but likewise as wonderfully good weights.

In relation to the English animals mentioned above, Mr. Evershed writes:

"The above figures show that tolerably-bred Short-Horns will return 7*s.* a week from birth on this system, at from 13 to 18 months old. Those Short-Horns which afforded the least return were bought in the market, and those which gave the highest were by Mr. Stanford's pedigree bull, out of his well bred, but not pedigree cows. The best feeders of

country-bred cattle in Sussex and Surrey inform me that they consider a fair average weight for animals, well fed from birth, 100 Smithfield stone at one hundred weeks, giving a return of one stone (8 lbs. dressed weight) per week, or 6s. ($1.32) per week."

Our authority mentions a steer killed that dressed 132 stone at one hundred weeks, equivalent to 1,760 lbs. live weight. Some sixteen months steers dressed, in the quarters, 600 lbs., having 120 lbs. of rough fat, and a very small proportion of offal. He states that the best feeders are able to reach an average of $1.43 per week at sixteen to twenty months, from a Short-Horn cross on common cows.

Feeding—Cost in England.

The English feeder is content with the manure resulting from this manner of feeding stock, if indeed he can get this for his trouble. As to the cost of making what is termed a "baby bullock" of seventy-one weeks, the following is given, reduced to our standard of dollars and cents:

Purchase of calf	$ 8 88
Four weeks' new milk, 6 quarts daily, at 2d per quart	6 16
Eight weeks' skimmed milk, 6 quarts daily, at 1-2d per quart, and 2 lbs. of meal at 1-4d per lb	5 68
Seventeen weeks in June, July, August and September, on a daily diet of 2 lbs. of linseed cake, 2 lbs. bean meal, mangel, hay, grass, clover, etc	17 57
Twenty-six weeks to end of March—5 lbs. of cake and meal daily, 3 4 bushel of roots, hay and straw for fodder	30 27
Sixteen weeks to harvest—8 lbs. of cake and meal daily, mangel, grass, clover—total, $1 59 per week	25 44
Attendance, 71 weeks at 11 cents	7 81
Insurance, interest, and rent of shed	5 54
Total	$107 35

Our authority estimates the value of the manure at 20 per cent. of the cost of the food, $85.12, or value of manure $17.02. His account stands thus:

DR.

A bullock 71 weeks old	$107 35
Profit	17 69
Total	$125 04

CR.

A bullock sold at 71 weeks old	$108 02
Value of manure	17 02
Total	$125 04

Let any feeder take a calf at five dollars at birth, figure the cost of everything fed in raising, new milk, skim milk, oil-cake, and ground food if raised by hand, or the interest on the cow if allowed to run, care,

insurance, etc., it will, if carefully managed, show figures on the right side of the ledger. Unfortunately there is no data to show, but our best feeders for early maturity seem perfectly satisfied with the outcome on steers of from two to three years of age, and probably might be so with younger ones if it were not the fact that animals do so well until three years of age that they dislike to kill them younger; besides, in the West it is found cheaper to grow the cattle rather slowly and give them somewhat longer time. It is a question of cheap food as against labor in the care of cattle in stables, in Winter, and soiling; that is, feeding in stables on grass and other food, artificially prepared, in Summer.

From what we have shown, the reader will come to the conclusion that we are a firm believer in shelter and humane treatment. The facts we have given will, we think, fully substantiate the correctness of these premises. No sensible person will, we think, doubt the soundness of the proposition that the animal should be kept growing during the cold season, when both feeding and shelter are necessary. The object with any feeder is to get the greatest net gain for the food consumed, and in the shortest time.

Under this system of feeding the profit was seen. The humanity lies in the fact that the animals had during their lives the greatest enjoyment that brutes are capable of—that of feeding and quiet rest. The owner has his reward both in a pecuniary and conscientious sense.

Summer Feeding.

It is only within the last few years that our best feeders have supplemented pasturage in Summer with grain. In England this has been done for years. The rational of the matter is this. To keep animals in the highest possible condition, the pastures must be flush, that is, they must produce full feed at all times. Every master-feeder knows this is not practicable during some of the Summer months. The July and August pastures will not carry what the May and June pastures will. Gradually they began to adopt the practice of fully stocking the pastures and giving the animals what grain they would eat in connection with grass. At times they will eat very little, especially when pastures are in their full succulence of young greenness; but a little meal will be eaten every day. The systems of the cattle thus remain in better average condition than when fed on grass only, in Summer, and on hay and grain in Winter. Animals when on succulent pastures require some dry food; they will often eat hay at such times. The meal or soaked corn, if animals are used to it, modifies the succulence of the grass and clover, containing as they do from seventy to eighty per cent. of water. Full grain feeding, with hay

in only small quantities, tends to the creation of unnatural heat and fever. Food ground, and fed moist with considerable hay, obviates this tendency somewhat, and the more the stomach is distended with fodder the less the tendency to fever.

Natural per cent. of Water in Food.

The proportion of water to flesh-forming and fat-forming substance in natural food, (herbage), will range from seventy to eighty per cent. The proportion of water necessary with dry feed may be stated at about sixty per cent. in Winter, and more in Summer, varying with the heat and humidity of the atmosphere. Upon succulent herbage in Summer the animal tissues will contain more fluid than in Winter, on dry food; hence the necessity and economy in Winter-feeding to keep the animals fully supplied with water, so that certain portions of their systems will not be obliged to abstract the natural fluids from other parts of the body. Upon turning cattle to pasture in Spring they often seem to fatten suddenly. Much of this is due to increased assimilation of water in the tissues. The advantage of pasturage in Summer is that it tends to ameliorate the condition of the animal by reducing the feverish state of the system, acquired during the Winter feeding on dry food. Hence the value of roots, where easily and cheaply raised—turnips in England; turnips, carrots, and beets, in the Eastern States; and beets and carrots in the West. In the West, roots are not given so much for their fattening quality: but when these are fed at the rate of one quarter bushel or less per day, they act as a digestive element to the other food, causing more perfect assimilation. When these are not to be had, bran should constitute a portion of the food given.

Animal Waste.

It is generally considered as true that about two-thirds of the food consumed goes to supply the animal heat and waste. All grass-feeding animals that have to sustain themselves for long periods in the wild state, on scanty food, accumulate large masses of fat in the Summer months. During the Winter this is gradually dissipated (consumed) in the effort to keep up the animal heat, and by Spring the animals are thin and weak. Precisely the same thing occurs in the ordinary way of wintering stock on hay out-of-doors. They become thin, often emaciated, and sometimes die, in the effort of the owner to see upon how little food he can bring them through alive. Not only all the food given has been consumed, burned up, in the effort to keep warm, but also all the fat, where accumulated in masses about the body. Not only this; before the animal finally

succumbs, the fat mingled with the muscles and other heat-forming substances, will have been consumed. Yet many persons who consider themselves humane and Christian men, follow this plan year after year. It is true they suffer in purse and in vexation. Is it possible to be supposed that their depleted pockets will compensate for the suffering of the poor brutes under their care? It is hardly a supposable case that it should be so.

Animal Heat.

The natural temperature of the body is 100 degrees. If the temperature go above that it indicates fever; if below it is a chill; either condition, if not counteracted, will be fatal to life. The advantage and economy of full feeding in Summer, as well as in Winter, will be understood when we remember, that, whatever the temperature of the air, the animal heat will be 100. When the temperature will average 60 to 65 degrees, as it will during the season of pasturage, it will require only food enough to raise this temperature by 35 to 40 degrees to bring it to 100. All else the animal eats goes to make weight. If during the Winter the average temperature be 30 degrees, it will require food enough to be eaten to raise the temperature by 70 degrees to reach blood heat and keep up the animal integrity. Here again all food taken in excess of the animal waste is gain. But another integer here steps in. It requires less proportionate food to keep the animal force intact with a high thermometer than with a low one; that is, it requires more than double to supply the waste with the thermometer at 20 than it does with the thermometer at 60.

There is a limit of cold beyond which neither animal nor plant can endure. In other words, when the cold becomes so intense that the capacity of the stomach to digest is counteracted by the animal waste, death ensues. Thus we often hear of whole droves being destroyed, where exposed to the force of strong chilling winds, as the "Blizzards" of Minnesota, "Northwesters" of the plains, and "Northers" of Texas. In a still atmosphere the animals would have withstood a much greater degree of cold, for the reason that they would have carried an atmosphere of heat about them. In the wind the heat was blown away, and in the attempt to supply heat as fast as destroyed the animal economy gave way and refused longer to exert itself.

Advantages of Full Summer and Winter Feeding.

From what we have written the reader will have learned that there is no economy in scant feeding of animals either in Summer or Winter.

The facts are, those feeders make the most money who not only give the warmest shelter in Winter, with liberal feeding, but who carry their stock fully up to the feeding point in Summer. Where corn is as easily raised as it is in the West, many of our best farmers will tell you they can produce an acre of corn for less than an acre of hay. We have cultivated 65 acres to the hand in a field of 1,500 acres, and at a cost of one and one-third days' work for team and man per acre, up to the time of, but not including, the husking.

One advantage of feeding grain the year round is that you may stock your pastures so fully that the grass will be kept evenly grazed, thus enabling you to carry more cattle in Summer on a given area of pasture, and enabling you to produce more corn for Winter feeding. Another advantage is, the animals become fatter, and thus do not lose so much animal heat in Winter. Still another advantage is, you hasten maturity, and thus save interest on capital, insurance and other items of cost.

These facts should be enough to convince the sensible man of the value of high feeding in connection with shelter, aside from the *animus* of this chapter, that the humane feeder—he who treats his animals most kindly and feeds best—is really the one who makes the most money.

CHAPTER VII.

HOW TO BUY AND HOW TO SELL.

THE VALUE OF GOOD CARE. —— ESTIMATING WEIGHT. —— ESTIMATING BY MEASUREMENT. ——BUYING TO FEED. ——HOW TO BUY BREEDERS. ——WHERE GOOD BEEF LIES. —— BUYING FEEDING STOCK. —— ANALYZING THE CARCASS. —— PROPER SHAPE OF WELL-BRED FATTENING STOCK. —— HOW TO BUY. ——BUYING MILCH COWS. —— BUYING DAIRY MILKERS. —— MILK MIRRORS. —— THE TRUE VALUE OF MILK MIRRORS. ——VALUE OF ESCUTCHEON MARKS. ——MILKERS IN ALL BREEDS. ——HEREDITY. ——DIGESTION. ——RESPIRATION. ——SYMMETRY.

The Value of Good Care.

There are very many farmers who, by care and attention to details in feeding their stock, and by kindly treatment, have done so with profit to themselves. They have raised them from calfhood. Let them undertake to buy cattle for feeding their surplus grain and fodder, and they are very apt to overrate the weight and true value of the cattle purchased. One point should always be kept steadily in mind: Never buy an old steer or cow for fattening. They never repay the cost and trouble they give. Thin cattle, ready for grass, if healthy, may give good returns on flush Summer pasture, if bought at the price per pound that you expect to get in the Fall. You will not only get the price of the flesh put on, but the cattle being thin and the muscles dry, your profits will be added to in the fluids absorbed, and the loss will lie with the former owner in making mere frames to be built upon. So animals bought in the Fall in common grass flesh, will increase wonderfully with good feeding and shelter. If you buy at $2.50 per 100 lbs., and so add 200 lbs. in flesh, and sell at $4 per 100 lbs., you not only get $8 for the flesh put on, but the difference between $2.50 and $4, or $1.50 per 100 lbs. on the original weight. That is, you buy steers at 1,000 lbs. each, feed 50 bushels

of corn per head, and sell them weighing 1,200 lbs. average. They cost $25 and sell for $48, leaving $23 as the value of the corn fed and care given. The manure in any country will pay for the care taken; so, your corn will have netted you near forty-six cents per bushel. From this, knowing the cost and price expected when fat, it will be easy to figure on profits, fluctuations and accidents excepted.

Estimating Weight.

An expert judge will estimate from seeing and handling steers often within ten pounds of their live weight. The buyer will always underestimate weight, and in nine cases out of ten convince the inexpert owner that the guess is right; in fact, more than half the time the seller will be convinced that he has the best of the bargain. The only safe way in such cases is for the seller to weigh. Every man who makes a business of fattening cattle should own a proper scale. He may save the cost in a single year. The merchant, the manufacturer and the builder, who work by guess, always end in bankruptcy. The only reason why farmers do not, is, they have that generous bank, mother earth, which never fails to respond, even to indifferent managers.

In weighing cattle note carefully why certain ones weigh out of proportion to others, and study whether the weight is in the prime parts, a broad loin and hips, and good barrel, or in heavy fore-quarters, with thick neck and big head and horns. Study carefully the points as given in detail elsewhere in this book, and as carefully remember them for future use. Thus you may in time become yourself an expert judge of stock. If an animal is to be killed, estimate his weight alive, how much he will shrink in offal and hide. When the quarters are weighed, if the record is not as you expect, examine carefully wherein the discrepancy lies. It is an especially interesting study for the young man, who expects himself to become a breeder and feeder of cattle. If a breeder, he must know how to sell; and if a feeder, he must know both how to buy and sell.

Estimating by Measurement.

Many breeders have rules of estimating the weight by measurements. There is no rule that comes nearer than good guessing, and all guessing should be avoided, especially when the guessing is to lie on the part of the buyer; that is, the seller should avoid trusting to the guess of the buyer, based upon measurement. No two animals will weigh alike according to measurement.

One rule, perhaps as good as any and for this reason given, is to find the superficial feet by multiplying the girth, just behind the shoulder-

blade, by the length from the fore part of the shoulder-blade to the root of the tail. Thus an ox girthing 7 feet 9 inches and measuring 6 feet in length would contain 7 3-4 times 6, or 46 1-2 superficial feet. For cattle grass fat the following is given as the weight per superficial foot:

Girth	less than 3 feet	11 pounds.
"	3 to 5 feet	16 "
"	5 to 7 feet	23 "
"	7 to 9 feet	31 "

Thus the steer as per above measurements should weigh 46.50 by 31, or 1,441 lbs. gross. Under this rule it is usual to deduct one pound in twenty on half-fatted cattle, from 15 to 20 lbs. on a cow having had calves, and if not fat an equal amount. The rule as above stated is of little or no value, except to those having no other means. In taking account of stock, this may come somewhat near the weight. For buying or selling the scale is the only true standard.

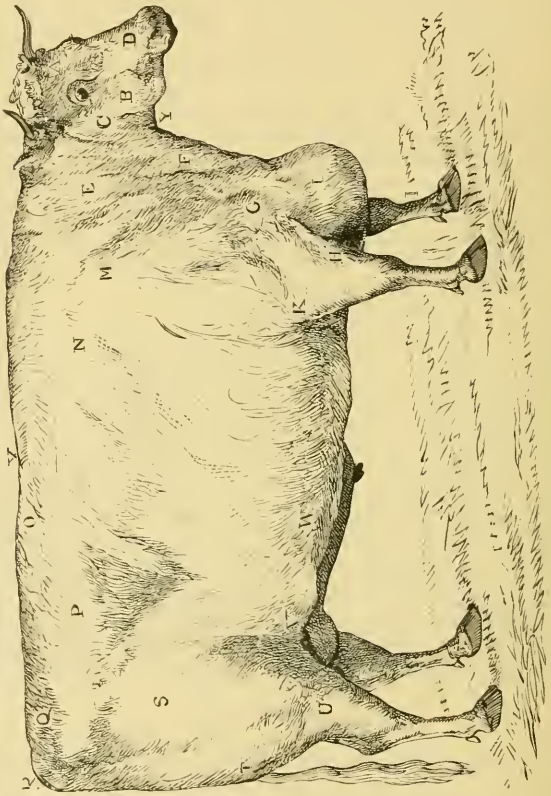
Buying to Feed.

In buying cattle either to graze or to feed fat, choose cattle that are young, that is, that will not have become mature before ready for sale. If to be kept a year, three year old past to four year old for natives and Devons, and one year less for Short-Horns or Hereford grades. Buy no overgrown, leggy animals; they are hard feeders. Neither should they be undersized, as this indicates want of thrift. The cattle for money, whatever their breed, are compact, smooth, fine boned, meek-eyed, soft haired steers, with skin of medium thickness; thick through the heart, round barreled, well ribbed, with broad rump, and the twist well down to the hock. Such cattle, whatever their breed, will fatten kindly and the meat will be of excellent quality. So far as age is concerned, the teeth must be the test. In this no person can err who has carefully studied the chart of the teeth in another part of this work.

How to Buy Breeders.

If the intention is to raise beef cattle the same rule will apply as in buying steers. In no case should the cow be more than three years old, and it is better that she never had a calf. In breeding for beef, milk is not the first essential. It is necessary, however, that the dam give a fair amount of milk, since the proper sustenance of the calf is what lays the foundation of the future value of the steer. No calf starved when young can make a valuable cow to breed from, and as is the dam so naturally will be the produce. Whatever is to be the outcome, avoid at

any price a vicious cow, or one with a wild eye or having a dished face. Her progeny will be sure to give you trouble, and will not give you cattle that will fatten to the standard of the picture we give you of Earl



EARL SPENCER'S PRIZE OX.

Spencer's prize ox; given not only as showing what Short-Horns were fifty years ago but as illustrating the terms to be used in describing the various beef points and other outward portions of the bullock.

Explanation.—*A*—Forehead. *B*—Face. *C*—Cheek. *D*—Muzzle *C*—Neck. *F*—Neck-vein. *G*—Shoulder-point. *H*—Arm. *I*—Gambrel or hock. *K*—Elbow. *L*—Brisket, bosom or breast. *N*—Crops. *O*—Loin. *P*—Hip. *Q*—Rump. *R*—Pin-bone. *S*—Round-bone, thurl or whirl. *T*—Buttock. *U*—Thigh, or gasket. *V*—Flank. *W*—Plates. *X*—Back, or chine. *Y*—Throat. *Z*—Chest.

Where Good Beef Lies.

The prime parts of the ox lie, as shown in cut, from *N* to *R*, thence to *S*, and back to *N*. Between *P*, *Q* and *U* are the primest parts. The second best are between *M*, *S*, *T*, *V*, *W*, and *K*. Between *S* and *U* are valuable pieces for smoked or dried meat. The ribs between *M*, and *S*; the flanks *V*, *W*, and thence to the brisket *K* are good corning pieces. It will be seen that this animal has a very small proportion of offal, and a very large proportion of valuable meat, being full and broad in the loin, thick ribbed, with the rump massive, square behind, and carrying beef below the twist, or junction of the thighs, well down to the hocks.

Buying Feeding Stock.

The novice in buying stock should carefully note the shape and make up. To the superficial eye the superior animals when thin will appear worse than the inferior ones; the bony parts will appear more prominent, and for this reason their breadth, when thin, will seem to be exaggerated; this, however, is only apparently so. An animal of no particular character may seem fairly smooth to the eye. Those accustomed to handling stock will know that superficial observation goes for little. The touch is what decides the value of an animal. The well-bred animal carries softer, smoother, and finer hair than the ill-bred one; its breadth from the shoulder to the rump gives it a bony appearance when thin, that in the scrub steer is partly concealed by the higher backbone and coarser hair. We are now speaking of no particular breed, but of all breeds and crosses that have characteristic points enabling them to lay on flesh. The scale of points for Short-Horns will make a good study. The illustrations of fat cattle show what they should be when fat. The picture of the Devon ox will show what a good feeder should look like off of good grass, and may be taken as the type for our best native cattle.

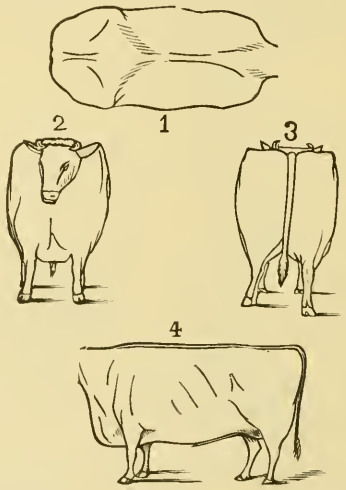
Analyzing the Carcass.

In all first-class steers every part of the animal, except the bones, hide, tallow, and offal, will be good consumable flesh. The roasts, steaks, and corning pieces will be of the best, so that when the four quarters are hung

up there will be no loss except bone. Let us now see what such an ox as we have shown will give. In the first place, his quarters will dress sixty-five per cent. of his gross weight. The loin above *P* and from thence to the top of the shoulder above *N* will give most superior steak and roasting-pieces. The shoulder-point or neck-vein back of *T* and the thigh at *S* make the best smoking-pieces. The plates *W* will make the richest of corned beef, while *R*, *S*, and *L* (the rump, round and brisket) make the best pieces for packing—good thick, juicy meat, and in large quantities. In fact such an animal will convert the food he eats into good beef, and plenty of it.

Proper Shape of Well-bred Fattening Stock.

Cut off the head, neck, legs, and tail, and well-bred beef cattle will present the appearance of an oblong square. Thus there is ample room



OUTLINE OF PRIZE FAT BULLOCKS.

for the legs and viscera through the width of the bosom and spring of the ribs, and this carries corresponding breadth behind, giving a broad loin and massive rump. Such an animal will feed heartily and kindly, satisfy the butcher when brought to the block, and be profitable to the feeder. Above we give four outlines showing animals made very fat, and

cut square to show the shape. There is no profit, however, to the feeder in cattle fattened to obese or immense weights; they are mere mountains of fat, and contain no more lean meat than animals fattened fairly ripe. There are few people who do not like well-fattened beef. Few, however, care to eat any but the lean. An animal, therefore, that is fattened just ripe is the heaviest in muscle, well marbled with fat. This is what the consumer wants, and what the feeder should seek to make. Smooth, fine-horned, medium cattle, according to the breed selected, are what give profits in this respect.

How to Buy.

In buying ordinary (that is native) cattle for pasturing and feeding fat during the Summer and Fall, always buy in the Spring. If the grass is good at the time of purchase, as it should be, no matter how thin the stock, if healthy and hearty. The thin stock will weigh less, and you will have to pay less for it. The loss will be with the farmer who grudges his animals sufficient to eat in Winter, rather than with the buyer. Generally all this class will sell cheaper in the Spring than in the Fall, and as a rule yearlings may be bought for less money in the Spring than the same calves would have brought in the Fall. If they have been fairly wintered they will be profitable to feed; if badly wintered, it will be questionable, unless the price paid is low enough to warrant the purchase. In any event the feeder must usually depend upon buying steers off of common keep. Good feeders are not apt to sell half-grown steers, nor those that one more season's keep will make ripe. The best money-making friends of the sagacious buyer are, after all, those who never read, and will not believe that anything in print relating to agriculture in any of its various departments can be of value. They do not know that as great advances have been made in agricultural art within the last thirty years as in any other industry, and that the best practical talent in Europe, and within the last few years in America, have been earnestly engaged in elucidating and applying practical science to agriculture.

In selecting milking cows the following doggerel verses from an old English magazine are as true now as when written as to what constitutes a cow for both milk and beef:

She's long in her face, she's fine in her horn,
She'll quickly get fat without cake or corn;
She's clean in her jaws, and full in her chine,
She's heavy in flank, and wide in her loin.

She's broad in her ribs, and long in her rump;
A straight and flat back, without e'er a hump;
She's wide in her hips, and calm in her eyes;
She's fine in her shoulders, and thin in her thighs.

She's light in her neck, and small in her tail;
She's wide in her breast, and good at the pail;
She's fine in her bone, and silky of skin—
She's a grazier's without, and a butcher's within.

Buying Milch Cows.

In selecting cows for milk, or heifers from which to breed milking stock the breeder must be guided by the same general principles as in buying beef-making steers. That is to say, the animals must be fine, with mellow though rather thin skin, and mossy hair; the head small, but face straight and rather long; the horns should be fine, short, and if somewhat curved it is a good indication. The eye must be bright and yet placid. The barrel, pelvis, rump and thighs should be roomy; and, for obvious reasons, avoid a dish-faced, and especially a wild-eyed cow, or one with a dull, heavy eye. The first shows viciousness, the last stupidity—both dangerous and both unprofitable.

In buying for milk, the object being to breed your stock, select heifers of three years old ready to come in, provided the stock bulls were suitable; if not, have nothing to do with them. In this case buy heifers of two years old that have never been bred. Then, by attention to what we have said upon breeding, you cannot go amiss.

Buying Dairy Milkers.

When the buyer is selecting cows simply to wear out in the dairy, and without any reference to retaining or improving the breed, all he has to look to is an animal that will give a good flow of milk, and hold the flow for a long period. Many cows will start out with large messes, and at the end of three months will hardly give enough to keep a calf; others will continue in milk for six months; others, again, will continue in milk well up to the time for again dropping a calf. These latter are the cows to buy. Select them according to the rules heretofore given, and of from three to five years old, but not unless they are well along in calf. A dairy cow will continue to improve in her milking qualities until she is six years old, sometimes until she is seven or eight; they will continue to give ample returns until ten years old, and often until eleven or twelve.

Milk Mirrors.

Besides the rules already laid down, there is an infallible sign in the milk mirror—or "escutcheon," as it is now called—in cows, heifers, calves, and also shown distinctly in the bulls of milking breeds. We have studied and bred by it since its first publication in the United States. It is the result of years of study by M. Francois Guenon, a practical

farmer of Libourne, France, and first reduced to a system in 1822. In 1828, at a public test and careful examination by the Agricultural Society of Bordeaux, the committee made an absolute and exhaustive report, in which they used this strong language: "*This system we do not fear to say is infallible.*"

The society decreed Mr. Guenon a gold medal, made him a member of the society, ordered fifty copies of his work, and distributed one thousand copies of their full report among all the agricultural societies of France.

This system was first made known in the United States, if we remember aright, between 1838 and 1840, and has been studied, believed, and acted on by many practical men; yet, curiously enough, it has never attracted general attention until within the last few years, since which time dairying and the breeding of dairy cows has come to be a regular profession. While we should not rely entirely upon the many classes and their variations, including a bastard escutcheon to each class, the signs as given by the author are most valuable in connection with other matters which are given. In the Guenon theory there are twenty-seven cuts or diagrams to illustrate his idea, varying from the fullest development in the growth of hair turned upward, to as near nothing, as is ever shown in the cow, but all having more or less of this peculiar development of hair on the parts named; this hair, to indicate a good milker, should turn upward, be short, fine and close; the skin easily raised, and with peculiar oval marks and scurf spots.

The True Value of Milk Mirrors.

So far as we have studied these signs, we have found them while not constant marks by which the quality and flow of milk could be accurately judged, yet most valuable in connection with other characteristic signs and configurations, which we have given for judging accurately what should constitute a good dairy cow. We have found it a most valuable aid in judging the milking qualities and time of continuance in milk. That in itself it does not constitute an infallible test is no proof of its being an unsound theory. That it is correct, as a rule, is sufficient to cause it to be given careful study and attention.

We do not hesitate to say that he who will study carefully the illustrations we give, and the statements made, while he will find many varying signs, will not only be convinced of the accuracy of the system, but will be able, either in the cow or calf to select with judgment. The milk sign also follows in the bulls as we shall show.

Mr. Charles L. Sharpless, of Pennsylvania, a close observer and good

breeder, in relation to the value of the escutcheon, as seen in Jersey cattle, gives his experience, which we condense as follows:

There is no point in judging a cow so little understood as the escutcheon. The conclusion of almost every one is, that her escutcheon is good, if there be a broad band of up-running hair from the udder to the vulva, and around it.

Fig. 1. Fig. 2

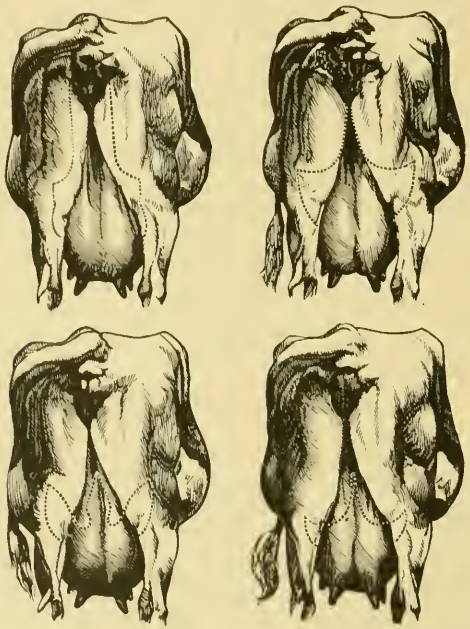


Fig. 3. Fig. 4

MILK MIRROR OF JERSEYS.

These cows with the broad vertical escutcheon are nearly always parallel cows; that is, with bodies long but not large, and with the under line parallel with the back. Their thighs are thin, and the thigh escutcheon shows on the inside of the thigh rather than on its rear.

Next comes the wedge-shaped cow, with the body shorter but very large, deep in the flank, and very capacious. This form does not usually

exhibit the vertical escutcheon running up to the vulva, but with a broader thigh may exhibit a thigh escutcheon, which is preferable to the other, thus—see Fig. 2.—Milk mirror of Jerseys.

In both vertical and thigh mirrors, where the hair runs down, intruding on the udder (as low as above the dotted lines) as in Figs. 3 and 4, it damages the escutcheon. If you find a cow with the hair all running down, and between the thighs—that is, with no up-running hair—stamp her as a cipher for yielding milk.

There are times when the udder of a cow with an escutcheon like Fig. 4 will be enlarged by non-milking, for the purpose of deception. It is always safer to judge by the escutcheon rather than by the large size of the udder.

The escutcheons of the best cows—those yielding the most and continuing the longest—will be found to be those which conform to Fig. 2.

The vertical escutcheon of Fig. 1 would not injure it; but if that ornamental feature has to be at the expense of the thigh escutcheon, Fig. 2 is best as it is.

Whenever an escutcheon is accompanied by a curl on each hind-quarter of the udder, it indicates a yield of the highest order.

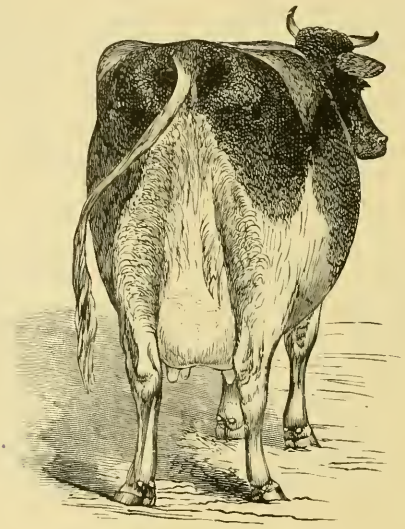
So far, we have noticed only the rear escutcheon, or that which represents the two hind quarters of the udder. The two front quarters are just as important, and should be capacious and run well forward under the body. If the udder in front be concave, or cut up, indicating small capacity, it represents reduced yield.

This front or level escutcheon is distinctly marked in the young heifer or bull, and can be seen by laying the animal on its back. The udder hair under the body all runs backward, commencing at the forward line of the escutcheon. This dividing line is very perceptible, from the fact that the hair in front of it all runs forward towards the head of the animal, while the escutcheon, or udder hair, all runs backward, over the forward quarters of the udder, around and beyond the teats, and ceases at the markings of the rear escutcheon on and between the thighs.

The breadth and extent forward of this front escutcheon indicates the capacity, in the mature animal, of the front quarters of her udder. In some cases this front escutcheon will be found of twice the extent that it is in others, and is evidence of that much more yield.

This examination enables one to see the size of the teats and their distance apart, and to test the looseness and softness of the udder skin. It is marked precisely the same in bulls, and can be easily examined at any age between one and ten months.

Many think that the escutcheon of the bull is of little moment, so that he has a good look. So far is this from being the case, that a bull with a mirror like Fig. 4, or worse, will stamp his escutcheon on, and to that extent damage, his daughters out of cows with escutcheons as choice as Fig. 2. In this way the daughters of some of the best cows come very ordinary, while, if you use a bull marked like Fig. 2, he will make a poor escutcheon better, and will improve the best. His injury or benefit will be doubled according to the escutcheon markings under the body in front of his scrotum. Hence the importance of the dam of a bull being unexceptionable in her udder and escutcheon. Her qualities inherited by her son will be transmitted to his daughters.



GREAT MILK MIRRORS ON HOLSTEIN COW.

While careful as to escutcheons, we must not neglect the other essential features of a good cow—the back, skin, hide, the rich colored skin, and the fine bone. Let the hair be soft and thickly set, and let the skin be mellow. This latter quality is easily determined by grasping between the thumb and forefinger the skin at the rear of the ribs, or the double thickness at the base of the flank that joins the stifle-joint to the body, or that on the inside of the rump-bone at the setting on of the tail. Let the

teats be well apart; let them yield a full and free stream, and be large enough without the necessity, in milking, of pulling them between the thumb and forefingers. And let us ever keep in mind that *the large yielder must be well fed.*

Prof. Magne, V. S., of the Veterinary School, Alfort, some thirty years ago, as to the relations below the escutcheons and the functions of the milky glands, and as differing from M. Guenon in some of the details, gives the following explicit information:

"The direction of the hair is subordinate to that of the arteries; when a large plate of hair is directed from below, upwards, on the posterior face of the udder, and on the twist, it proves that the arteries that supply the milky system are large, since they pass backwards beyond it, convey much blood, and consequently give activity to its functions. Upper tufts, placed on the sides of the vulva, prove that the arteries of the generative organs are strongly developed, reach even to the skin, and give great activity to those organs. The consequence is, that after a cow is again with calf, it draws off the blood which was flowing to the milky glands, lessens, and even stops the secretions of milk.

"*In the bull, the arteries, corresponding to the mammary arteries of the cow, being intended only for coverings of the testicles, are very slightly developed; and there, accordingly, the escutcheons are of small extent.*"

Value of Escutcheon Marks.

After the explanation, which accords very well with all that has been observed, it is easy to comprehend the value of the escutcheons. The more the lower ones are developed, the greater the quantity of milk; but *shape* is of consequence.

Still, whatever be the cause of the relations existing between the production of milk and the escutcheons, these marks cannot furnish data so certain as some have affirmed them to be.

In fact, the quantity of milk, and its quality, do not depend solely on the form and size of the escutcheon; they depend on the food, the particular management, the climate, the season, the temperament, the size and energy of the principal internal organs, the capacity of the chest, the influence of the generative system, etc. All these circumstances cause the quantity of milk to vary, without making any change on the extent of the escutcheon; consequently, it is impossible that the same relation can always exist between the escutcheons and the quantities of milk. We often see cows equally well shaped, having exactly the same escutcheon, and placed under the same hygienic conditions, yet not giving equal quan-

tities, or equal qualities of milk. It could not be otherwise. Assuming that a given tuft has the same value at birth, it cannot be the same in adult age; since, during life, an infinite number of circumstances occur to diversify the activity of the milky glands, without changing the figure or size of the tuft.

Is it not sufficient to refer to the inequality of milk given by the same cows, according as they have had one, two, or three calves, in order to make clear that M. Guenon has assigned too much value to the mark which he has discovered?

It often happens that two horses, having exactly the same constructure, and the same external forms, have not the same energy, the same fitness for work. The difference is owing, evidently, to the temperament, and the activity of the principal external organs; in other words, to conditions which it is often impossible to estimate by any direct method.

Now, seeing that temperament has an influence on muscles and bones, the action of which, however, is partly mechanical, resembling that of a lever, and exerts this influence so powerfully as to render their movements unequal in respect both of power and promptness, can we suppose that it has no influence on the entirely vital, or, at least, the entirely molecular working of the mammary gland?

It might, therefore, have been argued *a priori* that the mathematical precision assigned to a classification of cows is contrary to the most general laws of physiology; to propose a mark indicating that a cow will give so much milk daily, and for so many days, is to deceive ourselves, or to attempt to deceive others: the study of the phenomena of life proves that the action of the organs depends not merely on the size and their form, but on the general condition of each individual

We are able not only to oppose argument to the assertion of M. Guenon, but we can appeal to the difficulties hitherto experienced in applying his classification to practice. *M. Guenon has not yet found a single pupil worthy of him.* And among the thousands of persons who occupy themselves with his method, is there a single one who has acquired sufficient skill to justify the claims which the author makes for it?

It may be affirmed that, to form pupils *as skillful as himself* in judging of cows, M. Guenon would not only have to teach them that a certain figure for the tuft corresponds to a certain number of pints of milk, but he would have, above all, to communicate to them his perspicuity, his talent for observation, and his great experience; he would, in fine, have to fit them for estimating, in addition to the direction of the hair of the twist, the whole of the marks usually employed in making choice of milch cows.

All the attempts made on the Guenon method, not excepting those of

the author himself, prove the soundness of our opinion. The most skillful, when called to decide on the qualities of cows, whose yield of milk was well known, erred seven times on eight cows, and fifteen times on twenty-one. And, lest these errors may be attributed to chance, on account of the small number of cows submitted for trial, we should mention that other estimates proved erroneous 152 times on 174 cows, and 321 times on 352, and that the error amounted to 921 pints of milk on a total of 2,683 pints; in other words, there was error in regard to almost all the cows: and error amounting on an average, on each, to more than a third of the yield. On some individuals the estimates were wrong to the extent of from 17 1-2 to 21, and even from 26 to 28 pints a day.

Such is the truth as to the perfect nicety claimed for the escutcheon system. The system cannot do more than furnish an *approximate* estimate of the quantity of milk, and that in regard not to all, but only to the majority of cows.

What, then, has led so many persons to put confidence in M. Guenon's discovery? The great talents and knowledge of the author. The system has obtained the credit of results due to the experience of him who applied it.

By his discovery M. Guenon has rendered great service to agriculture; the escutcheon has the advantage of furnishing a mark which can be easily discerned, and estimated even by persons of no great experience in the selection of cows—a mark perceptible on very young animals, *and on bulls* as well as heifers—a mark which, when disencumbered of the complicated system in which it has been wrapped up will be in common use and facilitate the increase of good cows, by not allowing any but those of good promise to be reared.

Milkers in all Breeds.

Professor Magne also gives the following concise directions in relation to choosing a good cow, where he says:

"We find good milkers in all breeds, but they are rare in some and very common in others. It could not be otherwise. Milk properties, depending on the conditions which determine the formation of breeds, are due partly to the climate, the soil, the air, and the plants of the countries where the breeds have originated; and must therefore vary in our different breeds of horned cattle, with the hygienic conditions peculiar to each locality.

"Milkers, and more especially animals intended for breeding, must be selected among breeds celebrated for abundance of milk. Not that we can hope to import into our department, with a dry and warm climate,

all the qualities of the excellent milking breeds possessed by countries in which the soil is fertile, the air moist, and the sky often cloudy; but as the influence of climate, though very marked, takes effect only in the long run, the properties of the animals imported are maintained—though subject, doubtless, to gradual deterioration—during a period which varies with the precaution taken to preserve them; and for several generations the descendants of a good imported breed give more milk than individuals belonging to a breed found on the spot, where hygienic circumstances are not favorable to milking properties.

It is not to be forgotten, moreover, that under the influence of particular circumstances, which it is sometimes impossible to call into existence, animals manifest properties which we cannot produce directly. This explains why it is often more advantageous to import qualities possessed by foreign stock than to try to develop them in native stock.

As milking qualities are in a great measure dependent on structure and temperament, which are more or less hereditary, descent exercises a great influence.

Heredity.

In each breed, therefore, we should choose individuals belonging to the best stocks, and the offspring of parents remarkable for their milking qualities; for it is certain that good milch cows produce others which resemble them.

But it is especially necessary when selecting stock for the purpose of breeding milch cows, that particular care should be taken to select individuals belonging to good families. A cow of a bad milking family, or even breed, may occasionally be an excellent milker, and more than this is not wanted when it is not meant to breed from her. The same cannot be said when breeding is intended, because there would be little chance of her transmitting the accidental or exceptional qualities possessed by her; whereas the qualities forming the fixed and constant characters of the stock would almost to a certainty be transmitted to descendants.

These remarks, with regard to breed and parentage, apply to the selection of the bull, which, as experience demonstrates, acts like the cow in transmitting the milking qualities which distinguish the breed and stock.

Digestion.

The digestive organs have a great influence on the exercise of all the functions, and particularly on the secretion of the milk-glands. Where the digestive organs are defective, good milch cows are rarely met with.

Good digestive organs are known by a belly of moderate size, with

yielding sides, free from tightness, (in aged animals the belly is often large, though the organs which it contains are in good condition); a large mouth, thick and strong lips, a good appetite, easy and quick digestion, glossy hair, supple skin, yet firm, and somewhat oily to the touch. Animals possessing these characteristics may be expected to feed and drink heavily, and, if they are properly fed, make much blood, and yield large quantities of milk.

Respiration.

The respiratory organs complete the system of nutrition. The lungs bring the air breathed into contact with the blood, and render the system of nourishment complete. Hence, a good form, quick digestion and a healthy condition of the lungs are necessary to the production of a large flow of milk.

Milk Veins.

If the veins which surround the udder are large, winding, and varicose (dilated at intervals), they show that the glands receive much blood, and, consequently, that their functions are active, and that the milk is abundant. The veins on the lateral parts of the belly are most easily observed, and all authors decide them to be among the best tests for ascertaining the activity of the glands.

These veins issue from the udder, in front, and at the outer angle, where they form, in very good cows, a considerable varicose swelling. They proceed toward the front part of the body, forming angles, more or less distinct, often divide towards their anterior extremity, and sink into the body by several openings.

We can make the size of the milk veins prominent by compressing them in their passage, by pressing them at the place where they penetrate into the body. If we press the thumb strongly into the opening through which the vein passes: the width of the opening represents the diameter of the vein, and the thickness of the thumb which stops it, represents the volume of blood whose place it occupies. Sometimes the veins are divided. It is then necessary to examine all the openings by which they pass, in order to form a correct estimate.

Veins of the Udder and Twist.

The veins of the udder and twist are able to furnish valuable indications. They should, in both cases, be highly developed, large and varicose; that is, appear swollen and knotty. The veins of the udder have

no definite direction. They present themselves irregularly, with zigzag lines, knotted, and more or less oblique. They are never of very large size, except in cows that give large quantities of milk.

The veins of the twist directed from above downward, forming a winding line, interspersed with knots, resemble those of the udder in not being visible either in heifers or in cows of only fair milking quality. We cannot ascertain their presence in any but very good cows.

Of all the marks of abundant milk secretion, the best, and in fact the only infallible marks, are furnished by the veins of the twist and of the udder. To estimate them correctly it is necessary to take into account the state of the cow in respect to flesh, the thickness of skin, food, ability to stand fatigue, heat; all the circumstances, in fact, which cause variations in the general state of the circulation, and in the dilation of the veins. It is necessary, moreover, to recollect that in both sexes all the veins are larger in the old than in the young; that the veins which encircle the udder are those which, if the cows are in milk, vary most according to the age of the animal. Small when the animal is young, they continue to increase in size until after the cow has had several calves, when they come to their full development.

This proportion between the size of the veins and the milk secreted, is observed in all females without exception. The size of the veins and their varicose state being due to the blood attracted by the increased activity of the milk-glands, is not only the sign, but also the measure, of this activity—this connection. In fact, this connection is so close that, if the glands do not give an equal quantity of milk, the larger veins are on the side of the udder which gives the largest quantity.

The length of time during which milk is given corresponds with the activity of the organs which supply it. Cows which give most milk a day, also give it the longest; and hence, if no special mark is perceived, we can judge much of the duration of milk by the marks which determine its quantity. It may therefore be accepted that as a rule an abundant milker may be expected to give a long continued flow of milk.

Judging Age by the Teeth.

For the reason that the age of cattle can only be approximately judged by the horns, and in consequence of the liability to error, and especially the doctoring of the horns by the use of the file, sand paper and oil, we give a chart, showing from the cuts presented, the ages of cattle, from birth until they are five years old, when the teeth are fully developed, and also the appearance of the teeth at ten years of age. Thus at birth, it will be seen, there will be but two central teeth, *figure* 1; at two weeks it will have four teeth, *figure* 2; at three weeks it will have six teeth, *figure* 3; at a month old the jaw will contain eight incisors, and present the appearance as in *figure* 4. The mouth is then called full, as containing the ultimate number of incisors. These are not permanent, but temporary, or milk teeth, as they are called. At six to eight months old the central teeth begin to be worn, and show smaller than the others, see *figure* 5. At ten months absorption and the widening of the jaw will have carried the two central teeth still farther away from each other, and two other teeth, one on each side, will have begun to diminish, in fact will have distinct spaces between them, see *figure* 6. At twelve months absorption will have continued to two more teeth, leaving intact only the two outside teeth, *figure* 7. At fifteen months the whole of the teeth will present the appearance as seen in *figure* 8. At this time the true or permanent teeth will have been growing in the jaw, between and back of the milk teeth. *Figure* 9 shows the appearance at fifteen months of age, the two permanent central teeth appearing in the place of the two first milk teeth which have disappeared, and the other permanent teeth are shown in their several stages of growth. *Figures* 10, 11 and 12 show the teeth at two, three and four years past. At the age of five years the animal will have a full mouth, as shown in figure 13, and at ten years the incisors will present the appearance as in *figure* 14.

Thus any person by the use of the chart, and by examination of the teeth of cows, of ages known to correspond therewith, may easily become an accurate and prompt judge of the age of cattle, up to the age of four years. It will be seen, however, that in the four year old mouth, the two central pairs of teeth are beginning to be worn down at the edges, and in a flat direction, or inclining slightly to the inside; yet the animal has not a full mouth—that is, the incisors are not all fully up until it is five years old. See *figure* 14.

At five years old the teeth are all fully grown, and the peculiar mark on the teeth, called the cup, is shown in all. At the same time all will have become flattened, while on the two center ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone. From this time on we may depend both on the incisors and the grinders.

At six years old the animal will have acquired the last grinding tooth. This is the sixth molar and is, from the beginning, a permanent tooth. From this time until the eighth year, and indeed thereafter, in determining the age of the animal, the nature of the soil upon which it has been fed must be taken into account. Gritty, close fed pastures will wear them faster, and lush pastures slower. Thus in all the pasture regions of the West, and Southwest, the wear will be light. As a general rule, but admitting of many exceptions, at seven years old this line is becoming broader and more irregular in all of the teeth; and a second and broader, and more circular mark appears within the center of the former one, the most distinct in the central, or two central pairs—and which at eight years has spread over the six central incisors.

At eight years, a change takes place which cannot be mistaken. The process of absorption has again commenced in the central incisors; it is slow in progress, and is never carried to the extent seen in the milk teeth, but is sufficiently plain, and the two central teeth are evidently smaller than their neighbors. A considerable change has also taken place on the surface of the teeth; the two dark marks are worn into one in all but the corner teeth.

At ten the four central incisors are diminished in size, and the mark is becoming smaller and fainter, as shown in *figure* 14. The six central incisors are smaller, and at twelve, all of them are very considerably diminished; but not to the same extent as in the young animal. The mark is now nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.

From this time on they continue to diminish in size, and it is difficult to accurately determine the age. In fact except in the case of valuable blooded cows, bulls, or extra trained wosk oxen, and occasionally extra milkers in the dairy, few steers are now kept in the West past six years old, and few cows over nine or ten years of age.

CHAPTER VIII.

THE DAIRY.

RUSHING INTO NEW INDUSTRIES. —— THE IMPORTANCE OF DAIRYING. —— ESTIMATED PRODUCTION OF BUTTER AND CHEESE. —— CONDITIONS NECESSARY TO DAIRYING. —— HOW TO BUILD. —— SUB-EARTH VENTILATION. —— CARE OF MILK, TEMPERATURE. —— VARIOUS METHODS OF RAISING CREAM. —— MAKING DAIRY BUTTER. —— SALTING BUTTER. —— WASHING OR WORKING BUTTER. —— PACKING BUTTER. —— PREPARING PACKAGES —— KIND OF SALT TO USE. —— CHEESE MAKING —— CHEDDAR CHEESE. —— CHESHIRE CHEESE. —— HOW TO SELL BUTTER. —— UTILIZING WASTE PRODUCTS.

Rushing Into New Industries.

The impetus given to dairy farming within the last ten years, caused by the increasing export demand, and the large price which superior products both of butter and cheese brought in the markets at home and abroad, caused many persons all over the West to rush into the business, supposing that flush pastures and cheap grain were the sole conditions of success. Unscrupulous persons also made cheese of skimmed milk adulterated with oleo-margarine. Butter makers adulterated their products with oleo-margarine, and extensive factories East and West, backed by large capital, entered into the manufacture of oleo-margarine; vast quantities of which were sold as butter. In addition to this many persons supposed it was only necessary to stock their farms with cows, milk them, secure the cream, churn it, salt the butter and thus get rich. The result was, the markets were glutted with grease butter and skim or grind-stone cheese, as they were aptly termed, causing the degradation of really good cheese of American make in the English market, for the reason that the markets being flooded with dishonest cheese, and the industry being in its infancy here, but few makers had established a reputation, considered

good beyond doubt in foreign markets. During 1878, especially, the price of cheese went so low as to cause much money to be lost in its manufacture. The consequence was, many, who went into the business hastily and with few natural facilities for the manufacture, or knowledge of the business, as hastily went out of it. In 1879 a reaction took place, and both butter and cheese during the latter half of the year again paid the manufacturers large profits.

The Importance of Dairying.

Within the last ten years, Ohio, Michigan, the northern half of Indiana and Illinois, southern and central Wisconsin, central Iowa, and later some portions of Missouri, Kansas, and Nebraska have become great butter and cheese producing States, and the premiums awarded to Wisconsin, Iowa, and Illinois for dairy products at International and Inter-State fairs, show conclusively that there is plenty of territory in the West, where the conditions are of the highest order for the manufacture of first class butter and cheese.

As showing the worth and importance of this industry in the West, we need only show the receipts and shipments, at two principal markets, Chicago and Milwaukee, the first for butter from 1869 to 1878, inclusive, and Milwaukee for butter and cheese for the year 1878. That of Chicago was as follows:

Years.	Receipts. lbs.	Shipments. lbs.
1872	14,574,777	11,497,537
1873	22,283,765	12,851,303
1874	28,743,606	16,020,190
1875	21,868,991	19,249,081
1876	33,941,572	34,140,609
1877	42,236,366	36,514,983
1878, Aug. 24,	31,714,318	29,263,586

For the regular butter season—May, June, July and to August 24, 1878, inclusive, the receipts have aggregated 21,414,520 pounds, against 16,493,031 pounds for the same time 1877—an increase of 4,921,489 pounds. The shipments for the same period—May to August 24th inclusive, aggregated 19,821,660 pounds, against 14,495,864 pounds for the corresponding time in 1877—an increase of 5,325,796 pounds.

In Milwaukee the receipts for 1878 were:

Receipts of Butter	6,111,286 lbs.
Shipments of Butter	5,739,041 "
Receipts of Cheese	13 256,808 "
Shipments of Cheese	12,865,110 "

The exports of butter and cheese from the United States, and value, for 1877 and 1878 are given by the Chief of the Bureau of Statistics at Washington as follows:

	1878.	1877.
Twelve months ending Dec. 31, butter, lbs	26,656,198	23,014,268
" " " " cheese, lbs	139 249,276	112,567,954

Estimated Production of Butter and Cheese.

The value of land and cows in the United States employed in furnishing milk, butter, and cheese, is not less than $1,300,000,000, or the sum of nearly half the national debt at its highest point. Over three thousand factories are engaged in the manufacture of these articles.

The production of cheese is estimated at 350,000,000 lbs. per annum, and of butter about 1,500,000,000; of the former, 130,000,000 lbs. will be exported this year, and 25,000,000 lbs. of the latter. The value of the two is about $350,000,000 or $50,000,000 more than the wheat crop of the country: three times more than the oat crop; four times more than the potato crop; one-seventh more than the hay crop; one-third more than the cotton crop, and but one-fifth less than the corn crop. The number of cows in the United States is over 13,000,000, which is six times the number in Great Britain, over twice the number in France, two and a half times more than in Prussia, and more than in the countries of England, Ireland, Scotland, Wales, Denmark, Norway, Sweden, Russia, Finland, Austria, Hungary and Switzerland combined—although these countries together contain four times the population of the United States. The proportion of cows to the inhabitants here is twenty-three to each one hundred persons.

The production of cheese and butter increased thirty-three per cent. in 1877 and the exports have been in like proportion.

The cheese and butter exported in 1878 have paid freight to the amount of over $1,000,000 to the ocean commerce, or a sum almost sufficient to support a line of ocean steamers. These articles pay to the railroad companies over $5,000,000 annually for transportation, and the article of milk pays nearly as much more. Loaded on railway cars, ten tons to each car, the butter and cheese produced in the United States in one year would fill 22,000 cars, and make a compact line 135 miles long.

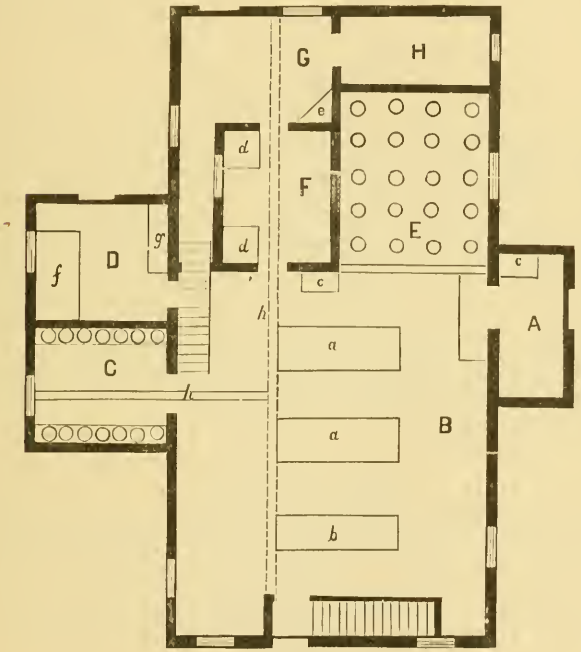
It is estimated that Great Britain, with a population of 32,000,000, consumes about 260,000,000 pounds of cheese annually, while the United States, with 50,000,000 inhabitants, consumes about 200,000,000 pounds annually. It is claimed that when only a good quality is put into the home market Americans will become as great cheese eaters as Englishmen.

Conditions Necessary for Dairying.

There are three natural conditions necessary for the successful prosecution of dairying: abundance of pure water, plenty of grass and cheap grain. There are also three essentials in its manufacture without which no person can succeed. These are, good cows, proper buildings and fixtures, and absolute cleanliness, from the stable to the package in which it is sold. Of course a thorough knowledge of the business must be possessed or acquired. If the dairy is conducted on the factory, associated, or co-operative system, only one person, the superintendent, need be an expert. Cold water is absolutely essential. In the West recourse must be had to ice for cooling purposes, except for the family dairy, and it is better there. The great drawback to dairying in the West has been the absence of cold springs and spring brooks. Deep wells, with windmill pumps, fully supply this need when there is an abundant flow beneath the surface, and when there is not, ice is used for cooling purposes. In fact, no large dairy, where butter is made, is complete without an ice house of sufficient capacity, not only for cooling the milk, but also, to afford cold storage for butter. Whatever the size of the dairy, whether large or small, no person can make money in the manufacture without facilities so that the temperature of the milk and butter can be kept at 60 degrees or less. It is not our purpose to enter into details as to the minutia of dairy work on a large scale. The person undertaking the business must employ a competent dairyman as superintendent. The owner will have plenty to do in attending to the farm, the business details of manufacturing, shipping, selling, etc. To enable those having good facilities for the business to get an idea of the building, we give an illustration showing ground plan of model creamery.

The cut given is a model in every respect, not only in arrangement, but in cheapness. The main building is two stories, 52 by 26 feet, with two annexes as shown, and cost all told, including all the fixtures and apparatus, only $2,500, the building itself costing $1,800. The arrangements are made with special reference to economy of space, labor and travel; to securing an equable temperature, and to the isolation of the cream and butter from odors that may arise in the manufacture or curing of cheese. The walls have three air spaces, one between the clapboarding and sheathing, one between the sheathing and building paper, and one between the building paper and plastering, thus making most perfect isolation. The windows are double. The milk, as received and weighed, is strained directly into the cheese vats, or into the deep cans, for the pool. This is about 20 inches deep, and is made by laying a brick wall to that height, and cementing it on the inside. It is supplied with water

from a well near the rear of the building, pipes being so arranged that the steam-pump can deliver either hot or cold water or steam where needed. Ice is used for this pool as needed. The press-room joins the manufacturing-room, and from the door of this a stairway leads to the curing-room, which occupies nearly all the second floor; the front stairway leading to an office and to a bed-room for the attendant, in front of the curing-room, which is designed not only for the cheese made here, but as a curing and storing-room for that from several factories in the vicinity. The cheese is delivered, as sold, from a door in the rear of the curing-room.



GROUND PLAN OF MODEL CREAMERY.

Explanation—*A*—Milk receiving room. *B*—Cheese manufacturing room. *C*—Press room. *D*—Engine room. *E*—Pool. *F*—Cream and churning room. *G*—Butter working and delivering room. *H*—Refrigerator *a a*—Cheese vats. *b*—Curd sink. *c c*—Wash vats. *d d*—Churns. *e*—Butter worker. *f*—Boiler. *g*—Engine. *h h*—Whey drains.

It will be seen that the cream and churning-room *F* is a separate enclosure within the main building, and which may be entirely enclosed from the main room, so that when the cream is placed it may be entirely isolated and kept so until churned and stored in the refrigerator. Those contemplating erecting a creamery cannot well improve upon this plan, one of the most modern known, except it be in some minor details to suit local wants.

How to Build.

Where the drainage is good the lower story may consist of a basement sunk three feet into the ground, of stone or brick, and it will be better if the whole building be of brick. The system of drainage should be mapped out, and a chart made. The drains should be laid in the most perfect manner, and with fall enough so they will not clog. Besides the factory drains leading to the waste vats, there should also be tile drains to carry off surface water. The foundation of the floor of the factory should, if possible, have a thin coating of tin shavings, or broken glass, say six inches thick well pounded down, and covered with water lime cement. Upon this a flooring of flags or bricks may be laid, covered with cement of water lime, which in time will become entirely hard, and the tin or glass below will prevent all burrowing of rats. The pipes, leading to and from the cisterns, etc., should be placed before the floor is laid, and the mortar carefully fitted to them. The ice-house should be plastered with water-lime, and a little vacancy left between the ice and the bottom of the house, to allow the water a small space. The top and side walls of the dairy-house should be finished with plaster, by which means a uniform temperature, indispensable to curing cheese, is more perfectly secured.

Sub-Earth Ventilation.

Of late years Mr. J. Wilkinson has advocated a system of sub-earth ventilation, simply by a six-inch tile, laid six feet deep and 300 or more feet long from the building. Two of this length,—or better, one of twice the length, with a wing, and vane connected with the out-door end, to catch air and convey it to the tile—will keep the basement well ventilated, and of the earth temperature of the depth at which the tile is laid.

Care of Milk.

The first requisite is absolute and unqualified *cleanliness*. We have already given directions as to cleaning animals before milking. The least

slovenliness in the help, in this respect, should be severely reprimanded, and if this does not avail, discharge him, or her, at once; it is as necessary as kind treatment of the cows.

If the milk is set in shallow pans, see that there is good ventilation to the dairy rooms, and that the pans are regularly scalded, and with hot, *bubbling* water—slight scalding will not do. Wipe dry, and sun, when possible. Allow no bad odors to accumulate near by from garbage or other causes. For this reason the family dairy should never be in the house, since the steam and odor from cooking, the dust from sweeping, etc., will taint the milk, cream and butter. English dairy women are many of them so particular that they will not allow the men who carry the milk from the yard to enter the dairy house. It is poured into a receiver outside and conducted in through a pipe, regularly scalded each time used, and covered tight from dust.

Modern Home Dairies.

One plan of setting milk is by the "Hardin system." By this system the milk is strained, immediately after being drawn, into deep pails and covered with a well-fitting lid, to exclude both air and water. It is then placed in a refrigerator, with ice above it. The drippings fall upon the pails of milk and form a pool of water, in which they are allowed to stand.

When a cold spring of running water can be had the milk may be immersed in deep open pails, in the cool waters. Unfortunately, in the West, springs are scarce.

Another excellent plan for small dairies is that known as the Cooley system, setting the milk in deep cans; a medium sized refrigerator box, containing space enough for from ten to twenty cows. These cans have close fitting covers, and are surrounded by ice cold water, and thus, if the heat and animal odor be expelled before putting in, there is no tainting or souring. The cream is taken perfectly sweet, in from twelve to twenty-four hours. It is very compact, and may be economically used even in small family dairies, of from ten to twenty cows, if the farmer cares to pay the royalty, the system being patented.

Animal Odor.

Expelling the animal odor is most important. To do this the milk is poured into a receiver, in the bottom of which are a few small holes, through which the milk is allowed to drop into a tank, large enough and high enough to catch all without spattering. This tank stands in cold water nearly to its brim; in this the milk may remain about fifteen min-

utes, when it may be set in any of the ways we have mentioned. Another plan is to heat the milk to 100 or 110 degrees and then cool.

Temperature.

Good butter can be made, if the temperature of the dairy-room does not go above 60 degrees. This is the proper temperature for churning and working the butter. The temperature for milk may be much lower: it should not be higher from the time the milk is brought in until the butter is carried away. So far as storing the butter is concerned, if the temperature be kept at 40 degrees, so much the better. This, however, cannot be done without ice.

Various Methods of Raising Cream.

G. C. Caldwell, Professor of Agricultural Chemistry, in Cornell University, N. Y., in relation to some European methods, says:

"Among the different systems prevalent in Europe, we notice the *Dutch* method in which the milk is cooled down to 60 degrees in a water tank, which requires usually from one and a half to two hours, and the milk is then set to the depth of four or five inches in a room where the temperature ranges from 54 to 60 degrees, and remains about twenty-four hours; the *Holstein* method, in which the milk is set at about the same temperature, without being first cooled in water, to the depth of one and one-half to two and one-half inches; the *Devonshire* method, described as long ago as 1784, where the milk is put in a cool room, standing at a depth not greater than from three to four inches for twelve hours; the vessel containing it is then set over the fire and heated till blisters begin to appear in the cream, or to about 200 degrees, when it is set aside again for twelve hours; the cream is very firm in consistency and can be made into butter by simple kneading, and has a sweet, pleasant taste. Mueller states that the skimmed milk does not retain more than one per cent. of cream; the Gussander method makes no account of temperature, except that it shall not exceed 61 degrees, so that no milk cellar or but only a light, dry and airy room is required; the milk is put in large shallow pans, filling them to the depth no more than from one to one and one-half inches; the milk is skimmed after twenty-three hours; in such a thin layer the milk is so well ærated that it remains sweet to the end, and the cream is sweet and very rich in fat."

Making Dairy Butter.

Mr. C. C. Buell, one of the makers of high-caste dairy butter in the West, stated his mode as reported by the Secretary of the Illinois Dairyman's Association:

"Cows were common stock—Durham grades and sprinkling of Jersey. Fed by running in fresh corn stalks during day time, on timothy and clover at night: in stable, with two messes of meal daily, consisting, by measure, of two parts corn and one part oats, together with the greater part of the sour milk and buttermilk from the dairy room. Number of cows, forty. The milk was strained through an iron strainer into deep pails, as soon as drawn, standing in open air until the milking was finished. It was then strained again into the same pails through a double thickness cloth strainer. The milk was set in a room without fire, temperature being between 40 and 50 degrees, Fahrenheit. During a part of the time, the temperature being above 50 degrees, the milk was set in water for twelve hours. The milk was skimmed after standing twelve to forty-eight hours, it being considered desirable to mix the newer and older cream, for the sake of flavor; but the whole stood mixed together from two to four hours after the last skimming and during the process of warming to proper temperature for churning. Most of the milk was skimmed a second time, the cream being included in succeeding churning. The churn (a dash churn with solid dasher, surface underneath concave), was started at a temperature of 62 degrees: as the buttermilk began to appear a couple of gallons of tolerably strong brine was added at a temperature of 58 degrees, and the churn stopped a moment afterward,—as with the addition of the brine, *at the proper temperature*, the butter separates very rapidly. As much brine as necessary was used in washing down sides of churn, cover and dasher. The butter was then dipped into a bath of not more than two gallons of brine; a churning of forty or fifty pounds being washed in four parts, in the same brine. Removed to a worker with rolling lever; the butter was so handled as to mix with the proper amount of salt with the least working possible. It was then placed in a tub slightly packed, covered with brine and allowed to stand three or four hours, when it was again placed on the worker, lightly worked and packed for market."

Care of Milk.

We have given the modes of some of the best butter-makers in the world. Now the principal points to be observed are: warm shelter, perfect quiet, for the animals, absolute cleanliness in all operations connected

with the milk, from the time it is drawn until it is made into butter. Just as the butter is forming in little granules, suddenly reduce the temperature to 56 or 58 degrees, so the butter will not mass together. It should never take less than half an hour to churn; quicker churning causes the butter to come salvy.

Coloring Butter.

The best coloring for butter is plenty of succulent grass in Summer, and rich feed in Winter. For home consumption we should never color butter. For sale it may be advisable. If so, use any of the pure preparations of annotto. It is perfectly harmless. If used, stir it in the cream. As to quantity, this cannot be stated. It will vary with the season. Every person must experiment, only do not use too much.

Salting Butter.

Take the butter from the churn in its granular state, and salt at the rate of two-thirds of an ounce to the pound of butter. Do not work it more than enough to fairly distribute the salt; and this by folding and pressing; let the grains of salt dissolve. It may stand from 12 to 24 hours before being worked the last time. Butter, through all the time and process of working, from the time it is churned until packed, should be kept in a pliable, waxy condition, about 60 degrees Farenheit is right, so as to work easily, and the salt all the time be in a dissolving condition. It is utterly impossible to work butter well that is operated upon while either too warm or too cold, or that is allowed to become so between times of working. The benefit derived by standing after the first salting, awaiting the second working, is to dissolve the salt by the moisture in the butter, and so set the butter-milk free, that it may be the more easily pressed out. The amount should not be more than will dissolve entirely, and this moisture should be well worked out before adding more. After this add salt sufficient to season to your taste, working to mix it evenly through the butter; then leave it there to cure and preserve.

A good average is about one ounce of salt to a pound of butter; some tastes prefer less and some more. Three-fourths of an ounce to the pound is light salting, while one and one-fourth ounces to the pound is heavy salting. We use to the first salting just two-thirds of the amount, and after the second working add the balance. Never go by guess, but use the scales, and in this way insure uniformity. No one can acquire a reputation for good butter, who does not make a uniform article. It never yet was made by guessing. If on a churning of butter you guess

it three pounds less than it is, and on the salt three ounces more than it is, you will make it far too salt. There should be a slight allowance of salt made for the condition of the butter, for when it comes soft it usually contains more butter-milk than when it comes hard, and a greater percentage of the salt will be carried off in the extra whey.

Washing vs. Working.

Equally good results can be obtained by washing or working the milk from butter, when skillfully done under favorable circumstances. In either case the only object is to free the butter from the milk, with as little injury to the flavor or grain of the butter as possible. In washing butter, the danger is mostly in injuring the flavor by introducing foreign matter in the water, while in the other case, there is more danger in over-working and so injuring the grain. In localities where pure water cannot be obtained, washing should not be resorted to, for butter is always sure to take up the impurities contained, as it will the taint of any decaying vegetable or animal matter that may be near. Many wells and springs which the owners of, or users from, believe to be pure and good, have in them decaying substances which render them entirely unfit for any use, much less to wash butter with. Decaying organic matter so introduced into butter acts very much like yeast in dough; at least, it starts a fermentation, so to speak, which soon destroys the butter. Allow no surface water to get into spring or well, or any filth to remain in them, and if they are not highly charged with lime, mineral or salts of any kind, there is no better or easier method than to wash the milk out quickly and thoroughly before salting.

Packing Butter.

If for sale pack in good, strong, oak packages, whatever the size that may be decided on, and let them be uniform, clean, and nice looking. A good package will not sell poor butter, but a slovenly package will often condemn the best. Never use the round wooden boxes, with handles, they are an abomination. In packing have the butter still at 60 degrees, it is then firm and yet not hard. First rub the package, bottom and sides, with salt, just what will adhere. Put a quantity of butter in the middle of the package, and press down firmly—do not rub, but press, thus causing a perpendicular and lateral pressure; thus you make all firm and exclude air. Then what brine remains in the butter will work to the sides and with the salt prevent it from sticking to the wood. So continue until the butter is within an inch of the top. Lay on a cloth cut half an inch larger

than the package, and wet with brine, working the edges down smooth, cover with a quarter inch of salt, cut another cloth an inch larger than the package, lay this on the salt, working smooth, as before. Head tight, bore a small hole through the head, fill full with brine, cork tight, and if kept level, and the butter has been properly made, it will come out all right when wanted.

Preparing Packages.

Use nothing but white oak; scrub them thoroughly inside and out with hot water and a clean brush; fill with clean, pure water; let them stand forty-eight hours in a cool place; turn out, scrub again with hot water, rinse thoroughly with cold water, and, while wet, sprinkle with salt, what will adhere. It is then ready for use.

What Kind of Salt to Use.

None but absolutely pure dairy salt should be used. So far as the manufacture is concerned there seems little to choose between the best American or English make. There is one thing about English goods, if warranted good they are so—laws against adulteration being very strict in England while they are very lax in the United States. At a butter test some years ago before a committee of experts to decide if it could be discovered whether the samples were salted with English or American salt, the committee were very much at sea, guessing sometimes one way and sometimes another. Price being equal, we should use the best English dairy salt. Yet in all the best dairy salt, whether English or American, the impurities are so slight that in the salting of either butter or cheese there could be no taste whatever. If the impurity be sulphate of lime it would amount to nothing. It requires 400 times its weight to dissolve it, and there is almost no moisture in good butter. Another impurity is sulphate of magnesia, (Epsom Salts) which if present in sufficient quantity would give butter a peculiar but not a bad taste. Chloride of calcium would give butter a sharp, pungent taste. and which would seriously depreciate the value both of the butter and cheese in which it was used.

Cheese Making.

The making of butter is both chemical and mechanical. It has this advantage, that any person can make butter as good as the best if absolute cleanliness is used; if there are no foul odors about the premises; if

the temperature of the dairy be kept equal, and if pure water be used. This is all that is required, besides attention to a few simple rules. These we have given, and there leave the subject.

The making of cheese depends almost entirely upon chemical action. Unless the conditions are right, good and uniform cheese cannot be made. These conditions can hardly be obtained in a farm house. Hence cheese so made is never uniform, except in rare instances now and then in the hands of a perfect cheese maker. Such, if this strikes their view, should lose no time in building a factory, or engaging one already built. Hence it would be a waste of space to enter into the details of cheese making even in a general way. Yet many will want to make some cheese and we append an account of the process of some celebrated English brands from the pen of Mr. John Chalmers Morton, of England, who has written upon the subject in the following concise yet comprehensive manner:

Cheddar Cheese.

"The Cheddar cheese shall be described as it was carried on upon the farm of the late Mr. Harding, of Marksbury, Somersetshire, who was one of the best makers in England, and who did good work for cheese-making in Ayrshire and other counties and districts which he and Mrs. Harding visited on the invitation of agricultural societies and others for the purpose of giving instruction in the manufacture of this kind of cheese.

"The morning's and evening's milk are together brought to a temperature of 80 degrees Fahr. If the night has been warm, a temperature of 78 degrees will give as great effectiveness to a given quantity of rennet as one of 82 or 84 deg. would give if the milk had been at a lower temperature for some hours of a cold night. The evening's milk having been placed in shallow vessels during the night to cool, and having been stirred at intervals during the evening is skimmed in the morning, and the cream, with a portion of the milk, is heated up to 100 deg. by floating it in tin vessels on the boiler. The whole of it is then poured through a proper sieve into the tub—into which the morning's milk is being also strained as it arrives—so as to raise the whole, as I have said, to from 78 to 82 deg. Fahr. This tub may be a large tin vessel, capable of holding 150 gallons, and provided with false bottom and sides, enabling hot or cold water to be passed under and around its contents. The rennet, made from two or three dozen vells, in as many quarts of salt water, and allowed to stand three weeks, is added—half a pint to 100 gallons—and the curd sets in about half an hour. The small vells of

Irish calves, which are killed at about a week old, are preferred, and they should be eighteen months old before use. The curd is slowly cut with a single long blade to and fro throughout its depth, in lines forming a 4-inch mesh upon the surface, and the whole mass is gently turned over from the bottom with a skimming dish and the hand. The whole is then again worked throughout with a "shovel breaker," a four-fingered paddle with wires across the fingers—great care being taken to do it gently, so that the whey shall not become too white. The curd is thus broken up into pieces not much larger than peas, and at least half an hour is taken in the process. Hot water is then let into the space around and below the cheese tub, and the whole is raised to 100 deg. Fahr.; and this, too, is done gradually, so as to raise the whole by degrees, not heating any portion to excess. This also takes half an hour. The hot water is then drawn off, and the curd is stirred by the hand and a skimming dish for another half hour in the midst of its hot whey, being at last reduced to a mass of separate bits the size of small peas. The whey, after settling for half an hour, is then removed—ladled, syphoned, or drawn—to its vat, where it stands about six inches deep, and is skimmed next day, yielding a butter, which should not exceed in quantity six to eight ounces per cow per week.

The curd stands half an hour after the whey is drawn off, and it is then cut in four or five pieces, turned over and left for half an hour, after which it is again cut and left for a quarter of an hour. After this, it should be in the slightest degree acid to the taste. If allowed to become too acid, it will not press into a solid, well-shaped cheese, but will be apt to sink broad misshapen. It is now torn into pieces by hand and left to cool: and thereafter it is packed in successive thin layers in the vat—a cylindrical or wooden vessel twelve inches or more wide and twelve inches deep—whence, after being pressed for half an hour, it is taken out (it is then probably midday,) and broken up by hand, and allowed again to cool. Then, when cool, and hard, and sour, and dry, and tough enough, (all this, of course, being left to the judgment of the maker), it is ground up in the curd mill; two pounds of salt are added to the cwt. of curd, and the whole is allowed to cool, and as soon as cold, it is put in the vat, and taken to press. It is then probably 3 p. m. The pressure on the cheese may be 18 cwt. The cloth is changed next morning. A calico coating is laced on it the second day, and the third day the cheese may be taken from the press, placed in the cheese room, bandaged, and turned daily, and afterwards less frequently. The cheese room should be kept at nearly 65 degrees Fahr. The cheese will not be ready for sale for three months.

The process lasts nearly all the day, but it is believed to produce the best cheese in the world; and its use is everywhere extending. Taking

its name from a single parish, it now prevails all over North Somersetshire, and is gradually extending into Wiltshire. Many dairies in Gloucestershire adopt the system; and some of its characteristic details are followed in Cheshire; and it is well known in Lancashire, Ayrshire, and Galloway.

The Cheddar cheese is made of various sizes, generally twelve inches wide and a foot high, but sometimes larger in both dimentions, and from 70 to 100 pounds in weight; the object being to make all the milk of one day on a farm of thirty to forty cows into a single cheese.

Cheshire Cheese.

Cheshire cheese, like the Cheddar, is made only once a day. The evening's milk is placed, not more than six to seven inches deep, in tin vessels to cool during the night, on the floor of the dairy; it is skimmed in the morning, and a certain portion is kept for butter—in early Summer, only enough, perhaps, for the use of the house, but in Autumn more, and in some dairies at least, nearly all the morning's cream is thus taken for churning. The skimmed cream, with a portion of milk, is heated up to 130 deg. Fahr. by floating the tins which hold it, on the boiler—sufficient quantity being taken to raise the whole of the evening's and morning's milk together to 90 deg. or thereabouts. The rennet is made the day before it is used; 12 or 14 square inches of "vell" (rennet skin) standing in a pint of salt water, kept in a warm place, making rennet enough for 100 gallons of milk. The Irish vell (rennet skin) is used, as it is obtained from very young and milk-fed calves.

The curd is set about 50 minutes; it is then cut with the usual curd-breaker, a sieve-shaped cutter, very slowly. The whey is syphoned, pumped, or lifted out as soon as possible; but before it is all removed a portion is (on some farms where the Cheddar system is followed), heated and returned to the tub, and the curd is left in this hot whey for half an hour. The whey is then drained away and the curd is left to get firm. When firm enough to stand on the hand in cubes of about a pound weight —this is an intelligent indication—without breaking asunder, it is lifted out on the drainer (a false bottom of rods), in a long tub with a stop-cock to it, and there left covered up for 45 minutes, after which it is broken up and well mixed with the hand with 3 1-2 to 4 1-2 lbs. of salt per cwt. It is then allowed to stand with a light weight upon it for about three-quarters of an hour longer, and is turned over once or twice during the time, being cut for the purpose into squares with a knife. It is then twice passed through the curd mill, and at length put into the vat, a cloth being first pressed into place by a tin hoop, and the salted curd being packed

gently by hand within it. The vats will hold a cheese of 70 or 80 up to 100 lbs; and tin hoops, placed within them, are used to eke them out, and give capacity for a larger quantity of curd if necessary. After standing in the vat, with a weight upon it, from one to two hours, according to the weather, it is turned over and put, still in its vat, into the oven,—a warm chamber in or near the brickwork of the dairy chimney—where it remains at a temperature of 90 deg. to 100 deg. during the night. Both when in the press and here the cheese is skewered, skewers being thrust into it through holes in the vat and every now and then withdrawn, so as to facilitate the drainage of the whey. The cheese is taken out of the vat in the morning and turned upside down in a fresh cloth. It is in the press three days, and it is turned in the press twice a day, being dry-clothed each time. It is then taken out dry-clothed, bandaged, and removed to the cheese room, where it is turned daily, and at length only occasionally, until it is ready for sale. In some dairies all skewering is dispensed with, and no pressure is used at the time of making, nor for two days afterwards, but the whey is allowed to run out of its own accord. Cheese manufactured in this way requires from 5 to 7 days in drying, but afterwards matures more quickly for market.

The cheese varies considerably in quality throughout the year, the earlier make of March and April being considerably less valuable than that of Summer and early Autumn. Some of this varying quality is owing to the quality of the milk, the cows being house-fed; but more of it is, in all probability, owing to the necessity of holding a portion of curd over from day to day, when the quantity is insufficient to make even one, or it may be two, full-sized cheeses daily. In such cases it is common to make one full-sized cheese, and hold the remainder of the curd over till the next day, keeping it wrapped up on the drainer or pan, and grinding it up in the curd-mill along with the curd of the next morning.

How to Sell Butter.

There is never any difficulty in selling good butter at a liberal price in any market, however low grease butter may be. The maker of prime butter need never be in a hurry to sell. The butter once made, WILL KEEP. But it will not be necessary to keep it. There are always particular people in every town, however small, who are ready to take good butter at good prices. Thus it is usual for makers to contract to supply during the year at a stipulated price. During the flush season of grass, butter is packed down, to be drawn on when needed. Thus the manufacturer always has a supply on hand, and the customer is more than satisfied to have a good, sweet lump of butter on his table every day in the

year, and does not grudge the extra five cents above what he would have to pay the grocer, for what those who do not know the difference might suppose was good.

If a larger quantity is made than will supply the family trade of the village, the large markets are always open, and there good butter will always bring a good price. All that is wanted to know is that the butter is made by one whose reputation is established and who would not sell a bad article, and all that can be made will be eagerly taken. It is simply a question of cleanliness, attractive package, careful attention to the details in making, and as careful a determination never to ship when there is danger of the thermometer going below 60 degrees. The rest is all plain, clear sailing, with large profits accruing. To insure large profits from dairying, the master must be about early and late, night and day, and Sundays as well.

Utilizing Waste Products.

The skim milk, buttermilk, and whey, must be fed either to calves or hogs. As far as whey is concerned, there is not much good in it for the nourishment of calves, unless it be supplemented largely with meal and oil-cake. A shoat will fatten on the waste products of the dairy, one to each cow, by using a very little corn. Some dairymen prefer to feed the waste to the cows. This is probably not the best use to which it could be put. Skim milk and buttermilk is worth more to feed to calves, we believe, than disposed of in any other way. Here again we will give the experience of Mr. I. H. Wanzer, of Illinois, who believes with us that to make dairying permanently profitable, the raising of dairy cows must be a part of the business. To close the chapter we append his statement:

I tried the experiment, last season (1875), of raising calves upon the skimmed milk from my creamery; and as the result of this experiment may interest some of you, I will give you a few figures kept in connection with the experiment, from which you may draw conclusions as to whether it pays to raise calves in connection with a creamery or not.

Number of calves put in, 120, at $4.00 each	$ 480 00
Number of gallons of milk fed, 67,200, at 1 1-2c. per gallon	1,008 00
Oats fed, 840 bushels, at 30c	252 00
Cost of labor in feeding	255 00
Pasturage, stabling, etc	100 00
Total	$2,005 00
These calves sold at an average of $21.50 each, at an average of seven months old	2,580 00
Leaving a profit of	$485 00

This amount passed to the credit of the milk would bring it up to two cents per gallon, which is equal to six cents per pound for cheese, and this kind of cheese would not have brought three cents per pound at the season I fed it, for it will be remembered that this milk set thirty-six to forty-eight hours, and all the cream was taken out.

I am so much encouraged in this way of raising calves that I expect to stock again the coming season. I have now fifty-five young calves and ten older ones. Many of my neighbors and patrons are bringing their best heifer calves to me, and marking them, expecting to bid them in at my sale next Fall, I paying the market price for them when received

PART IV.

DISEASES OF CATTLE;

THEIR CAUSES AND PREVENTION; HOW TO KNOW THEM; WHAT TO DO.

DISEASES OF CATTLE.

THEIR CAUSES; HOW TO KNOW THEM; WHAT TO DO.

CHAPTER I.

Diseases in General—Recognizing and Distinguishing Them.

FARMERS SHOULD UNDERSTAND SYMPTOMS —— OF DISEASES IN GENERAL.——USE COMMON SENSE. —— GRADUATION OF DOSES. —— FREQUENCY OF ADMINISTERING.——FORMS OF DOSES. —HOW TO GIVE MEDICINE. —— INJECTIONS. —— VAPORS, SPRAYING AND FUMIGATION. —— ANÆSTHETICS. —— TO DEPRIVE OF SENSATION.——BLISTERING.—— FIRING.——SETONS. —— ROWELS.——SEWING UP WOUNDS.—— FOMENTATIONS.——OPERATION OF BLEEDING. —— RECOGNIZING AND DISTINGUISHING DISEASES.——THE PULSE.——THE BREATHING.—— THE ANIMAL HEAT.——THE SKIN AND HAIR. —— THE POSTURE. —— INDICATIONS OF PAIN.——SPECIAL SIGNS IN CATTLE.

Introductory.

The immense value of the stock interests of the United States and the frequent outbreak of introduced contagious plagues, and of enzootic, epizootic and various epidemic diseases, that at intervals have visited localities or swept over whole continents, would seem to call for special training in veterinary science and art in every agricultural college in the United States; yet, until within the last few years, but little attention has been paid to this profession, and to-day the subject is not given that attention its importance demands, except in a few instances. Veterinary surgery has heretofore been flippantly termed "horse doctoring" by professors and heads of too many of the colleges, endowed with the people's money "to teach such branches as relate to agriculture and the mechanic arts."

Of late, however, a more enlightened course has been pursued. Many of the agricultural colleges are paying attention to this important study, especially since the violent outbreak of splenic fever over the West and East from the introduction of Texas cattle, and still more lately from the outbreak and spread of contagious pleuro-pneumonia in a number of the Atlantic States. Owing to the low state of veterinary science generally, and the disdain with which the few highly educated and thoroughly scientific investigators in the United States — mostly French and German graduates — have been looked down upon by those who should have been too glad to welcome them to the profession of medicine, and the esteem in which mere quacks and leeches have been regarded by the community two notable facts are made patent: First, the exclusiveness of certain puffed up "college Dons," who suppose that all knowledge must come from classic sources. Second, that the people at large, farmers and stock raisers, who from their habits and training could not be supposed to understand surgery or medicine, except in its simplest forms, have been thrown into the clutches of mere pretenders to anatomical knowledge and the treatment of diseases. Of late there have been many honorable exceptions, until now nearly or quite all of these people's colleges, forced thus in many instances by public outcry, are taking strong means to foster veterinary science, and make it what it should be, and really long has been in other enlightened countries, an important, as it is an honorable branch of human science.

There are many valuable works extant in various languages, upon veterinary science and practice. They will be of little value to farmers and stockmen; all that this class can deal with must necessarily be only those symptoms that can readily be discerned, and remedies so simple in their nature that they can be easily procured and applied. In fact great care and attention should be given to first symptoms, as also to good nursing. Discard all strong physics, and heroic treatment by purging, bleeding, and the surgery of main strength. Good care and nursing in the treatment of animals is now regarded (as it is in the treatment of human patients) as among the most important means of cure. Indeed with animals it is of the greatest importance, since brutes are only able to indicate the region of pain and disease by mute signs, entirely unintelligible in the majority of cases to the ordinary observer.

Of Diseases in General.

In the description of symptoms, and the treatment of diseases, it would be out of place here to go into learned discussions on the nature and pathology of diseases; so also it would be futile to dilate upon the

symptoms and treatment of diseases. Only those most common, or fatal, will be specially noted. Fortunately veterinary art is congenial with the medical treatment of the human family, and the same paths that lead to a knowledge of human diseases will indicate to any intelligent local physician the means to be used with brutes. Humane physicians, now-a-days,—to their credit be it said,—are not slow in coming to the relief of the farmer and stockman in prescribing and giving advice in the absence of regular veterinary surgeons. Such are veritable benefactors, inasmuch as they greatly alleviate distress and do much to discourage quackery; and when found, they should be freely consulted. This deviation from the regular medical practice, owing to the sparsely settled nature of many portions of the country, seems very necessary and even imperative.

In the prescriptions for cattle, we shall use the most simple formulas possible, wherever found, and whatever simple medicines will avail, especially those compounded of herbs, as better adapted to the treatment of domestic animals. In connection with these, other agents, both mineral and mechanical, must be employed. In short, what we have aimed at is to state symptoms and remedies for such diseases as may be treated without the advice of a regular veterinary surgeon, and in such language as any intelligent person may understand.

In this, while we shall not attempt originality, except it may be in the matter of presentation in some instances, we shall use and quote from the very latest authorities in veterinary science in the United States, England, France, Germany, Austria, Belgium, Holland, Sweden, Italy, and other minor countries, where veterinary science has been accorded that respectability which should accrue to a labor having for its aims the saving of life, and the amelioration of suffering, in a direction second in importance only to that of the human family: and in preventing loss, so far as it may be possible, of live stock, the raising of which is of greater importance to mankind than any other single human industry. Thus, in presenting symptoms, we shall use and quote freely from the latest works in reformed practice. What we present will not be as seeking so much to aid the veterinary practitioner, as the farmer himself; not a work to supersede other authorities, but a substitute, in a limited sense, as to the treatment of certain diseases, so that the intelligent reader may comprehend: advising, in every case, when the operator does not understand the symptoms clearly, to seek the advice of the professional veterinarian, if such may be had. If such be not within reach, then consult the best physician in the neighborhood.

Use Common Sense.

Why, in the sickness of animals, the owner should try random remedies, and go from one to another, at the suggestion of each different adviser, as the matter may seem to strike them, is inexplicable. In nine cases out of ten, with proper nursing and care the animal will recover, simply by keeping the bowels moderately open by mild physics and injections (which will be indicated) when costiveness and impaction is present; or of sedatives, stimulants and astringents when the reverse is exhibited. Such conditions as are often fatal during the gravid state of female animals, and succeeding delivery, abortion, false presentation, etc., and the means of relief; contagious and epidemic diseases—these from their special importance will receive due prominence. Of the non-contagious and local diseases every farmer should seek to make himself familiar with the symptoms, so that ready means may be used for the relief of suffering animals. In all this the operator must be guided by intelligence and use the least possible exhibition of force. It may be necessary to hamper an animal for the performance of some operation. When necessary, it is not merciful to use half-way measures. The humane man, however, will do so with as little pain to the animal as possible. If necessity should require killing as the best means of dealing with the ailment, the humane man will be actuated by no sentimentality about taking the life of an animal. He will kill promptly and surely, as the best means of alleviating the suffering of the animal, or of preventing the spread of infectious and contagious diseases.

Graduation of Doses.

As a rule cattle require one and a half times as much as horses; sheep and pigs require one-third as much. Professor James Law, of Cornell University, in his work, *Veterinary Adviser*, has presented the manner of graduation, frequency, and form of administering doses, in the following concise language:

The doses given may be held applicable to full-grown animals of medium size, therefore some allowance must be made in any cases in which the patient exceeds or comes short of the average of his kind. A similar modification must be made as regards young animals, not only on account of their smaller size but also of their greater susceptibility. The following table may serve as a guide:

[TABLE OF DOSES FOR DIFFERENT ANIMALS].

Horses, etc	Cattle.	Sheep.	Swine.	
3 years.	2 years.	11-2 years.	15 months.	1 part.
11-4—3 years.	1-2 "	9-18 months.	8-15 "	1-2 part.
9-18 months.	6-12 months.	5-9 "	6-8 "	1-4 "
5-9 "	3-6 "	3-5 "	3-6 "	1-8 "
1-5 "	1-3 "	1-3 "	1-3 "	1-16 "

Allowance must also be made for a nervous temperament, which usually renders an animal more impressible; for habit, or continued use, which tends to decrease the susceptibility for individual drugs; for idiosynerasy, which can only be discovered by observing the action of the agent on the particular subject, and for the influence of disease when that is likely to affect the action. Thus, in most diseases of the brain and spinal cord, and in some impactions of the stomach, double the usual quantities of purgative medicine will be necessary: while in influenza, and other low fevers, half the usual doses may prove fatal. In acute congestion of the brain, stimulating narcotics (opium, belladonna, hyoscyamus) would aggravate the symptoms, etc.

Frequency of Administering.

Anodynes, antispasmodics, narcotics, sedatives, and stimulants, may generally be repeated once in four or six hours in order to maintain their effect. Alteratives, diaphoretics, febrifuges, refrigerants, and tonics, may be administered twice daily. Purgatives should only be given when necessary, and should never be repeated until from the lapse of time we are assured that the first dose remains inoperative. Thus, unless in urgent need, a horse should not take a second dose of physic under thirty-six hours after the exhibition of the first: and in all cases, until the medicine has worked off, he should be kept at rest and allowed only warm bran mashes and water with the chill taken off. In ruminants a second dose may be ventured on in twelve or sixteen hours, and in carnivora (dogs, etc.) and omnivora (swine, etc.) in from seven to ten hours. Emetics should be given in full doses, and repeated in five or ten minutes if they fail to take effect, their action being further provoked by copious draughts of tepid water and tickling the roof of the mouth with a feather.

Forms of Doses.

Drugs may often be given as powder or solution in the food or water; they may be made into a soft solid with syrup and linseed meal, rolled into a short cylinder and covered with soft paper; they may be converted into an infusion with warm or cold water, or into a decoction by boiling;

or they may be powdered and suspended in thick gruel or mucilage. They may be given, in a liquid form, from a horn or bottle; or, as a short cylinder or pill, which may be lodged over the middle of the root of the tongue; or, as a sticky mass, they may be smeared on the back of the tongue; may be given as an injection into the rectum; or, finally, in the case of certain powerful and non-irritating agents, they may be injected under the skin.

No agent should be given until sufficiently diluted to prevent irritation, if retained a few minutes in the mouth, and irritants that will not mix with water (oil of turpentine, Croton oil, etc.,) should be given in a bland oil, in milk, or in eggs after being thoroughly mixed.

How to Give Medicine.

Few things are so awkwardly done, as a rule, as giving medicine to farm animals. In the hands of a careful and expert person, a strong glass bottle is good. A better instrument is a flattened bottle of block tin, which for cattle should hold two quarts. The most usual instrument, and on the whole the best for ordinary operations, is the horn. Select one of which the point turns down and the large end up; form this of the proper size and fashion so the opening will be oblique.

Drenches should always be thoroughly mixed, and well shaken before they are given. If a fit of coughing ensues, free the animal at once and until it be ended. In operating with cattle do not irritate the animal unduly. Always operate from the right or off side. Pass the left hand over the head, and in front of the horn, seize the upper jaw firmly in front of the grinders, turn the head firmly back, the operator standing well braced, the back firm against, and as well forward of the shoulders as possible. Thus having the animal with one side against a wall, or the side of the stall, it must be a very vicious cow or bull that a strong, expert man cannot handle. If, however, the operator does not stand well forward and well braced, he may be severely kicked, since an ox, like a deer, can reach well forward with their hind feet. The usual quantity for an ox is from one to two quarts at a dose, if liquid, of ordinary decoctions and solutions.

Injections, or Clysters.

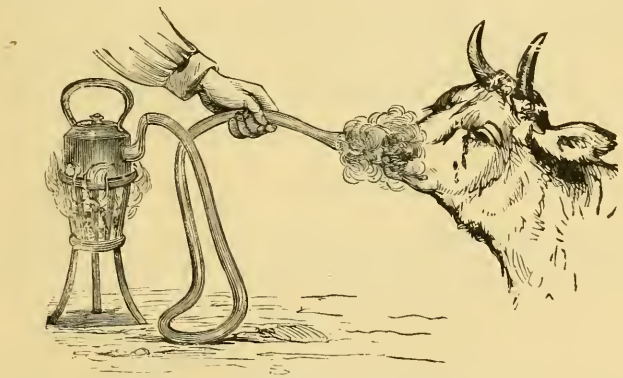
A large number of medicines, both liquid and solid, may be as easily administered per rectum as by the mouth. In administering injections, it is not necessary that much pressure be used. The intestinal canal of animals is lower than the opening. Thus fluid substances will fall by

their gravity. A good instrument for use may be a pail, with a tube extending from the bottom connecting with a half-inch rubber hose, of suitable length, so that the pail may hang just high enough above the animal to be out of their reach in moving about. Oil the end to be inserted into the rectum, and the fluid may be passed into the gut, as much or as little as may be desired, and with much better effect than when strong pressure is brought to bear on the fluid.

When solid substances are administered per rectum, they are called suppositories. They are often useful and simple, as in the case of a small cylinder of soap, for young calves, to encourage the action of the bowels and ducts: and in the case of cows, in the use of disinfectants, to purify the discharges and lessen the danger of puerperal fever; suppositories are made into form by means of soap, starch, lard, etc.

Vapors, Spraying and Fumigation.

These are medicaments drawn in with the breath. Chloroform and ether may be administered by means of a sponge filled with the agent and



APPLICATION OF STEAM TO THE NOSTRILS.

held to the nose. Vapors are easily produced from liquid substances by means of an atomizer, sold by all druggists.

Steaming is often of great benefit. Hot water, either plain or medicated, may be held under the animal's nose, and the steam strongly driven off by plunging a hot iron into it at intervals. A hot bran mash, in a nose bag, readily gives off steam. A better form for steaming the nostrils would be that given above.

For the promotion of discharge of the nostrils, the nose-bag will be indicated; its form and fastenings are shown in the annexed cut.

NOSE BAG FOR STEAMING.

Powders for easing the expulsion of the secretions of the nostrils, or for local application to diseases of the inner surface of the nose, may be a simple tube of tin in two parts, which may be taken apart and put together like the joints of a stove-pipe, with a rubber tube on one end and a mouth-piece on the other. Charge with the powder, and blow with sufficient force to carry the agent where wanted.

When an anæsthetic is used, it should not be held to the nose continuously, since, if undiluted with air, it is fatal. Watch carefully and suspend the use of the anæsthetic as soon as unconsciousness is produced, to be renewed from time to time as may be necessary. They should not be used unless under the advice of a surgeon or physician, since the need can hardly be expected except for the performance of some intricate surgical operation. The following is endorsed by high veterinary authority:

No 1. 1 Oz. alcohol,
2 Oz. chloroform,
3 Oz. ether.

Shake the bottle well before using it; pour a teaspoonful or more at a time on a sponge; hold it to the nostrils. Two or three moments should be enough to overpower the strongest ox.

Blistering.

Blistering is a valuable remedy, when it is required to ease the absorption of deposit, to stimulate the vessels to effect organic change, as hastening the ripening of an abscess, or the reduction of an enlarged gland; they should be entirely confined to cases where the acute inflammatory symptoms have ceased. Blisters do no good in deep-seated inflammations. Yet the quack, if he *suspect* internal inflammation, claps on a blister, which only agonizes the dumb brute, and generally leaves a permanent blemish. When a blister is found necessary, before applying, always as

an ointment or fluid, and never as a plaster, cut or shave the hair from the part, wash and dry thoroughly, and apply with strong friction for several minutes. The following, if thoroughly applied, will raise a blister, and will not leave a blemish:

No. 2. 1 Oz. Powdered Cantharides,
12 Oz. Lard heated to 212 deg. Fahr.
Mix well together and stir until cool.

A sweating blister of medium strength to be used to produce irritation and a watery discharge without raising a full blister, and which may be applied separately to the same spot and without removing the hair, is made as follows:

No. 3. 1 Oz. Powdered Cantharides,
1 Pt. Alcohol.

Add neither corrosive sublimate, arsenic, acids, nor turpentine to blistering agents. They are not useful, are often injurious, and always give unnecessary pain.

As a rule, sufficient irritation can be produced on cattle by mustard and hot water, well rubbed in, and this form should be used except in particular cases. The following rules should be carefully remembered:

1.—Never blister more than one or two spots at the same time.

2.—Be careful about blistering in hot weather.

3.—Never blister an inflamed part when there are symptoms of mortification.

4.—There is always danger of producing strangury in horses from blistering.

5.—When a blister causes great nervous irritability, loss of appetite, or difficult urination, wash the blistered surface with strong soapsuds of soft soap, dress it with sweet oil, and give a full dose of opium.

6.—The second day after a blister has been applied, foment the part with warm water, and dress it with lard or oil.

7.—An animal that has been blistered should be prevented from biting, rubbing, or otherwise irritating the blistered part.

Firing.

The actual cautery is most valuable in bone diseases, or chronic lameness. In certain diseases it cannot be successfully replaced by any other counter-irritant. The iron should be at a full red or white heat, and used with a light hand, so that a distinct impression is made. More than one leg

should not be operated on at one time. It should never be performed by inexpert hands. The hair must be closely shaved, and the animal securely fastened. A better way for the novice is to cut a piece of bacon rind with some of the fat attached. The iron, which should be flat or slightly hollowed, is to be heated to a dull red heat. Place the bacon rind on the sprain or tumor, and apply the iron firmly for two or three minutes, and afterwards more lightly, until the rind is dried or burned. This may be repeated at intervals of two or three days. The influence will be potent, and will leave no scar. It should never be used on cattle, except in the case of a tumor, where the animal is valuable.

Setons.

Setons are used in cases of bone diseases, in the healing of old fistulas, by producing a new and healthy inflammation in its sides. They should be inserted the whole length of the canal.

Setons are composed of tapes, threads, or fine wires, pushed just underneath the skin by means of a seton needle, entering at one point and coming out at another. Fasten the ends, to prevent dropping out, smear with irritant salve and turn every day or two to keep up a constant irritation and discharge. The following will be found good ointments for smearing the setons:

No. 4.
1 Part powdered cantharides,
8 Parts oil of turpentine,
8 Parts Canada balsam.

Put the two first in a bottle and keep warm for two days and add the balsam

A simple ointment would be:

No. 5.
3 Parts citrine ointment,
1 Part oil of turpentine.
Mix.

Rowels.

These are wounds made with rowel scissors or a bistoury, and kept open with a pledget of tow or other substance, smeared with ointment, as used for setons. They are rarely used now by good surgeons, and are not to be recommended, since their action is that of the seton.

Sewing up Wounds.

The bleeding of wounds having been checked and properly cleaned, the edges are brought together and held in position by means of stitches

or sutures. The interrupted suture is made by carrying a suture needle armed with white silk or white linen thread, through the two edges of the wound and cutting off, leaving about three-inch ends on each side of the cut; bring together and tie. So proceed until you have the wound nicely closed, the lips of the wound or skin being carefully brought together.

The twisted suture is better in inexpert hands when it can be used. Bring the edges of the wound together, pass a strong pin through to hold in place, and twist a fine wire or lace a strong thread across the protruding ends of the pin to hold the edges of the wound firmly together. So proceed at intervals of three-eights of an inch until the wound is closed.

The wound thus sewed, dress with a plaster or ointment and bandage to prevent threads or pins from being torn out. Remove them as soon as the surfaces have united, which should be in four or five days.

Fomentations.

These are applied by wrapping the part to be treated with flannel bandages or woolen cloths, and keep the wrappings constantly wet with hot or cold water, or mixed with any appropriate addition as vinegar, laudanum, etc. They are used to cleanse or soothe irritable wounds, to reduce internal inflammation, or relieve external inflammation. Unless persistently used for hours and kept constantly wet, they had better not be attempted. After the operation is finished, rub dry and clothe warmly, to prevent chill, which will surely occur. As an additional precaution, a little mustard rubbed in would be beneficial. When it can be applied, a sheepskin with the wool on, wrung out of hot water, makes a good agent for fomentation.

The Operation of Bleeding.

There is no operation in veterinary practice that has been more abused by quacks and other persons ignorant of the true necessity, than bleeding. It should never be performed except by those who have been instructed in the operation, and only in those cases where by common consent of the profession it is allowed. If a decided impression is to be made, as in apoplexy, from five to seven quarts should be taken from an ox, according to the conditions. If the jugular vein is pressed upon just below where the incision is to be made, it will soon show prominently. Use a thumb lancet in preference to a fleam. When sufficient has been taken, raise the two lips of the wound, and bring them together between

the thumb and finger, pass a common small pin through the edges and weave thread across and over to keep all in place.

Recognizing and Distinguishing Diseases.

The following explicit and detailed rules for recognizing diseases in animals, should be carefully studied: Anyone who would become expert in recognizing diseases in animals, must study them carefully in the healthy state, and make himself thoroughly familiar with their habits, appearance and general physiology. He must practice feeling their pulse and the heart, listening to the sounds of their lungs in breathing, and taking their temperature, by feeling the skin and also by using a properly constructed thermometer. He should watch the appearances of the eye and tongue, and note the positions assumed when asleep and awake. He should observe the character and frequency of their appetite. For it is in the variations from health in these particulars that the veterinarian discovers the guides which lead him to the recognition of the particular disease he has to treat. We will examine each of these items separately, and assure our readers that if they will verify our statements by practice on the living animals, they will soon be in a position to take charge of them when sick, quite as well and often a great deal better than the average farrier, as he is to be found in this country.

The Pulse.

The pulse differs very much in the domestic animals. In the full grown horse at rest, its beats are about forty per minute; in the ox from fifty to fifty-five; and in the sheep and pig, about as in man, that is, averaging seventy to eighty beats in the minute. In calves and colts, and in animals well advanced in years, the pulse increases, in health, to about twice these figures; and it is also increased by hot, close stables, full feeding, and the condition of pregnancy.

The pulse may be felt wherever a considerable artery passes over a bone. It is usually examined in the horse on the cord which runs over the bone of the lower jaw, just in front of its curved portion; or on the bony ridge extending upward from the eye, or inside the elbow. In cattle conveniently reached over the middle of the first rib, or beneath the tail. There is a marked difference of force in the pulse of the two species: that of the horse being full and rather tense, while in the ox it is soft and rolling.

When the pulse differs materially from these conditions in any direction, it is a sign of disease. If rapid, full and hard, there is high fever

or acute inflammation; if rapid, small and weak there is low fever, loss of blood, or weakness. If very slow we may suspect brain disease; if irregular, now fast and in a few seconds slow, we should look for a diseased condition of the heart.

In the sheep, the pulse if felt by placing the hand on the left side, where the beatings of the heart can be felt; or at about the middle of the inside of the thigh, where the femoral artery passes obliquely across the bone.

The Breathing.

The breathing is next in importance. If the ear is applied to the throat of a healthy horse or ox the air will be heard passing through the windpipe with a regular, steady, blowing sound; if applied to the chest a soft rustling murmur will be heard, like a gentle breeze in the tree tops, caused by the air passing in and out of the fine tubes and vessels of the lungs. But where the lung or throat is diseased, these sounds are very much changed and in many directions, which it is not necessary to dwell on here, but which will at once indicate the presence of something amiss with these important organs.

If the forefinger of the the left hand is placed firmly on the chest and smartly tapped with the ends of the three first fingers of the right hand, the sound will be noticed to be more resonant and clear than when the same procedure is practiced on the solid thigh. This is because the lungs are not solid, but are always in health well expanded with air. But in various diseases, as pneumonia and pleurisy, they fill up with fluid and become solid, then the sound given out, by thus percussing them, as it is called, is like that on any other solid part of the animal. Hence this is another very important indication of disease.

By practice on healthy animals the character and boundaries of these sounds can be learned so closely that any variation from them will be at once detected, and will sometimes reveal the presence of an unsound condition when nothing else will.

The rapidity with which the act of breathing is performed can easily be counted by the heaving of the chest. In health in the adult horse at rest it is from eight to twelve times a minute, and in the ox a little faster. Any great increase without obvious cause, is a positive sign of diseased condition.

The Animal Heat.

The temperature of animals can be ascertained, to a slight extent, by

the feel of the skin, the ears, and the legs. A hot, dry skin in a horse generally accompanies a feverish condition. Cold ears and legs are a sign of serious disease. But the only scientific, that is, accurate plan, is to use what is called a "clinical thermometer;" that is, one, the bulb of which can be bared and inserted into the rectum. After it has remained there two or three minutes, the mercury will accurately indicate the temperature of the blood. This in health is 98 degrees, and any deviation from this, even of a few degrees, is a certain sign of disease. Those veterinarians who have practiced sufficiently with this instrument to become skilled in its use, declare it invaluable in their business, as affording them grounds for opinions about diseases which no other symptoms could.

Thus it has been found that every disease has its own degree, a temperature at which it is either favorable or fatal. For example, if in that sometimes prevalent epidemic among horses, cerebro-spinal meningitis, the thermometer rises as high as 104 degrees, it is a certain indication that the horse will shortly die; while in such a disease as inflammation of the lungs, the mercury will register 108 degrees, or 109 degrees, and the horse recover. If in gastric or typhoid fever the heat has been 103 degrees, and falls to 100 degrees, and then suddenly rises again to its previous figure, the chances are terribly against the patient, no matter what the other appearances may seem to say. These few examples will serve to show how valuable the instrument may become in the hands of an intelligent person.

The Skin and Hair.

The skin in its general feeling and appearance is an important guide to the condition of an animal. A dry, scurfy appearance is a system of indigestion, and liability to joint affections. What is called "hide bound" is a symptom of a general state of poor nutrition, arising from indigestion, improper food, worms, or a want of proper exercise. The skin feels stretched and hard, as if too small for the body. The condition known as "staring coat," when the hairs stand out like bristles, is often the only symptom of a low state of health. Whenever an animal is disposed to shiver, with shedding of the coat, when exposed to moderate cold, or without such exposure, it is on the edge of some disease. A persistently staring coat, without other symptoms of disease, often indicates the approach of an attack of farcy or glanders; and when with this are repeated shivers or chills, we may expect the strangles, weed, or other diseases with suppuration. When in an attack of disease the skin becomes covered with a cold sweat, the life of the animal is in great danger.

The Posture.

The position of an animal, its mode of standing and lying down, are all significant. Lying persistently on one side, or obstinately maintaining one position, shows that any other is painful. Horses stand as long as they possibly can, as they breathe much easier in the upright position; and if they once lie down, they soon despair and die. Hence the rule is with a horse to sling him up, in various ailments. With cattle it is different, and it is much less important to keep them erect. When animals cannot rise, it may be from weakness, or from palsied limbs, or from severe injuries or sprains.

Indication of Pain.

The feeling of pain in animals is indicated by their flinching when the painful part is touched; by the care which they take in lying down, walking or standing to "favor" the part, and by the appearance of the eye. Distress and suffering are generally plainly apparent in the face of sick horses and cattle.

Special Signs in Cattle.

In cattle, the horn at its root yields, by the sensation it imparts to the hand, a rough idea of the temperature of the blood, and the cow-leech generally feels it as the doctor does the pulse, as a part of the indispensable programme of a professional visit. If the temperature is natural, he concludes there is no fever; if cold, and the tips of the ears also cold, it is a sign of some serious internal congestion; the blood no longer circulating in natural force through the extremities.

The muzzle is another part he takes note of. In health this is moist, covered with "dew," as the saying is; but in disease, especially fever, it is dry, hotter or colder than natural, and sometimes changed in color, paler or injected with blood. By looking at the flanks, the regularity of the respiration is noted, rapid and irregular heaving there betraying the disturbance of the important function of breathing. In ruminants also, the second mastication of the food is among the first of the vital processes to become disturbed in disease. When a cow or an ox "loses the cud," as it is called by herdsmen, that is, ceases to ruminate without apparent cause, there is sure to be a feeling of sickness about the animal which is thus interfering with one of its processes of digestion.

CHAPTER II.

GESTATION, DISEASES AND ACCIDENTS THEREOF.

PLURAL AND MULTIPLE GESTATION.——TREATMENT DURING GESTATION.——BIRTH.——PROLONGED LABOR.——LARGE PRESENTATION.——UNNATURAL POSITIONS OF THE CALF.——FLOODING.——PRESENTATION OF AFTER-BIRTH.——INVERSION OF THE WOMB.——LANGUID LABOR.——IRRITABILITY AND STRAINING.—TEMPORARY PARALYSIS.——ABORTION.——ISOLATION.

Plural and Multiple Gestation.

Fleming, in his work on Veterinary Obstetrics, gives a lucid and accurate account of single, plural, and multiple gestation in animals.

Among the domestic animals there are species which are naturally *uniparous*—produce only one at a birth; and others which, in a normal or physiological manner, bring forth two, three, or more, at a time, and are therefore designated *gemelliparous* or *multiparous* gestation, being known as double, triple, quadruple, &c.

It is seldom that twins are produced by the larger domesticated animals, and particularly by the mare and ass, though instances are recorded of these; while in the cow, sheep, and goat, the occurrence of twins, triplets, or even more young creatures at a birth, are not so scarce.

The causes of *multiparity* are not well ascertained. It may be due to simultaneous ripening of two or more Graafian vesicles, which, rupturing at the same time, allow the escape of the ovules they contain, and which may become impregnated at a single *coitus*. Or a Graafian vesicle may contain two or more ovules, as Brischoff has witnessed in women; and these arriving together in the uterus, may be fecundated at one time. Or it may even happen that the vitelline membrane contains two yolks, as sometimes occurs in the fowl's egg; and as the vitelline mass is the essen-

tial part of the egg, it is evident that when this contains two of these masses, they ought, if fecundated, to produce two embryos.

In the first case, as Saint C'yr points out, each fœtus has ordinarily all its annexes distinct and completely independent; or it may be that the two charions are fused together, in which circumstance the two fœtuses will then have a common envelope. In the second hypothesis, this fusion of the charions appears to be the rule, although the envelopes may also be independent; and in the third case—that of the two vitelluses contained in the same vitelline membrane—not only the envelopes but also the fœtuses may become united more or less closely and thus give rise to double monsters.

Finally, it is also possible that two ovules may become detached from the ovarian cluster, though not simultaneously, but successively, and be fecundated, one after another, at two successive copulations within a brief period. Occurrences of this kind are by no means rare, yet have been wrongly adduced as instances of superfœtation.

What to Do During Gestation.

As a rule the cow should be dried about the sixth or seventh month when stock breeding is the object. When milk and not calves is the object the flow may be continued to within six weeks of calving.

Grazing should always be allowed as much as possible, the exercise and grass both being favorable to healthy gestation. In Winter the food given should be nutritive, easy of digestion, cooling, and of such quality as not to induce either constipation or undue laxity. Water should be especially pure and plentiful, and not excessively cold; in fact, all frozen food is to be avoided. Cleanliness is essential. Harsh or cruel treatment, running by dogs, all danger of fright must be avoided. Surgical operations and severe medication is to be avoided, especially drastics. Suitable diet is to be used as a regulator of the bowels; powerful narcotics, sedatives, and other strong physics, if they do not impair the dam may imperil the life of the fœtus. The veterinary anomalies in gestation are fully treated in Fleming's work on Veterinary Obstetrics, to which we are indebted for much valuable information.

Births.

As a rule in natural parturition there is nothing gained by undue haste. The animal should have quiet and be left to itself so long as everything is going on tolerably well. In the majority of cases nature will assist herself to a safe delivery. A roomy stall, in Winter well warmed, should

be provided with rather thin but compact bedding. In Summer, or other mild weather, let the cow be out-of-doors by all means; in a small grass lot is best.

Prolonged Labor.

When the labor is prolonged from excessive size of the fœtus, and this is suspected beforehand, or if time do not press and there is no special excitement in the cow, and there is delay in the descent of the calf, oil the hand and arm and feel for the neck of the womb in the vagina. If it be rigid carry extract of belladonna up the vagina and smear the neck of the womb for a few times. This should cause relaxation of the parts. If the time is passing carry a narrow-bladed, blunt-pointed knife in the hand in the vagina; find the mouth of the womb with the forefinger, slip the knife along the finger until it enters the neck of the womb about a quarter of an inch, and make a slight cut in all four sides of the neck by turning the knife. A slight nicking will suffice, since the mouth once loosened in its contraction, the neck will give way, and the bag of water will accomplish the rest.

Large Presentation.

Sometimes the calf is so large that the muscular efforts of the cow can not force the mass forward. In this case do not resort to strong means until all others fail. Let a small-handed man introduce both hands, well oiled, up the vagina, carefully working forward beside the calf, gradually pressing apart the orifice; pass closely to the calf with the hands, and as the pains commence, pull forward as strongly by pressure against the fœtus. When a main effort is made pull forward, and at the same time slip the hands slowly back, and the calf will often follow. Repeat this again and again as the pains are renewed. We have never failed in but one case in so delivering the calf, and in this case the calf had to be dissected in the body. This no person unskilled in surgery should attempt.

Unnatural Positions of the Calf.

These are various, and, except in the six cases we mention, and in the order of their frequency, resort should be had to a veterinary surgeon. The following manner of relief is endorsed by various reliable and well-known authorities:

Unnatural Positions of the calf.—The natural position of the calf on its exit from the womb, is with its head and fore-feet first, the head between the feet and the back upwards. Six unnatural positions are enumerated by writers, which demand the assistance of the surgeon. We give them in the order of their frequency, with the appropriate treatment they require.

First—Position with tail first. Press the haunches back with the palm of the hand, take hold of the bend of the hough of one leg, pull at it and reach the foot; seize the other foot in the same manner, bring them forth and deliver the body.

Second—Position with fore-feet appearing without the head. Push the feet back until the head can be seized either by the jaw or nose, and pull it down between the feet. No further aid will be required. This needs a long arm, and prompt action between the pains.

Third—Position with belly upward, head over one shoulder, fore-legs first. Gently push the calf back between the pains, and bring the head down between the legs.

Fourth—Fore-feet first, with head under the brisket. Push the calf back, find the head, and draw it down between the fore-feet.

Fifth—Head alone, or only one fore-foot with it. Push the calf back and search for the fore-feet, or foot, under the belly; when found, bring forward one at a time, by placing the hand under the knee and using gentle pressure.

Sixth—Belly upwards, the fore-legs folded and against the mother's back, the head, side or hind-leg appearing. If the hind-leg appear, put it back; seek for the head, and if possible turn the calf, to bring the fore-feet and head to the mouth. When this fails, throw the cow, put her on her back, and with a rope and pulley, or two or three stout assistants, raise her hind-quarters considerably higher than her shoulders. In this position the calf can be easily pushed back in the uterus, so that it can be turned and brought to the natural position.

Many surgeons make it a rule to fasten the part presenting with a cord and slip-knot before going in search of the part they desire to bring to the mouth. The cord is held by an assistant, and serves as a guide.

The principal obstetric instrument in the cow is the hook. This is made of wrought iron, four inches long, with a loop for the cord at the straight end. When by no other means the calf can be delivered, or when removing a dead fœtus, this hook is fastened in the socket of an eye, under the jaw or in an ear, and by gentle and steady traction the resistance is overcome.

Finally, the fœtus may have to be taken out piece-meal, an operation which requires considerable skill on the part of the operator, to avoid wounding the womb and vagina when he is dissecting the calf.

In all such operations certain general rules should be observed, as follows:

First—Thoroughly anoint the hand with lard, or oil, before introducing it into the vagina.

Second—Make the examinations while the cow is standing, and between the pains.

Third—In pulling at the feet, enclose the claws in the hollow of the palm, so that they will not tear the delicate coats of the womb.

Flooding.

Sometimes after a natural birth which has been rapid, and often after an abortion which has been brought on by violence, there is a severe attack of "flooding," or bleeding from the womb. It may escape from the vagina, or it may be indicated by paleness of the mouth and nose, weak pulse, great weakness and coldness of the surface, and the womb be found to be filled with clotted blood.

Treatment.—The hand should be introduced into the womb, the clots and any remaining portion of the after-birth seized and extracted, and a sponge dipped in hot vinegar and water, or very hot or very cold water alone, be wrung out in the uterus. A full dose of fresh ergot of rye, one to two ounces, should be given without delay.

If these measures fail, a piece of ice the size of a walnut should be carried into the womb and left there; or a tea-spoonful of powdered alum should be stirred in a tea-cupful of milk, and a sponge of this be squeezed out in the womb. Internally, Prof. Gangee recommends, for either the mare or cow,

No. 6
3 Oz. Compound tincture of cinnamon,
5 Oz. Diluted sulphuric acid.

Mix and give two table-spoonfuls for a dose every one or two hours, in a quart of water.

Retention of After-birth.

There are many causes leading to this. The most common of these are hurried deliveries, adherence of the after-birth to the walls of the womb, and poverty of the animal. Retention for two or even three days under ordinary circumstances is not especially serious. If left to putrify, fetid discharges will exhaust the animal. The blood is poisoned, and the animal either dies or remains unhealthy for life. After forty-eight hours, if trouble still exists, the hand and arm well oiled should be introduced,

and the after-birth carefully separated from the walls of the womb by picking with the fingers and nails, and gradual but firm pulling. The whole having been completely removed, syringe the vagina thoroughly with the following:

No. 7. 1 Oz. Chloride of lime,
1 Qt. Soft water.

Give the following as a physic:

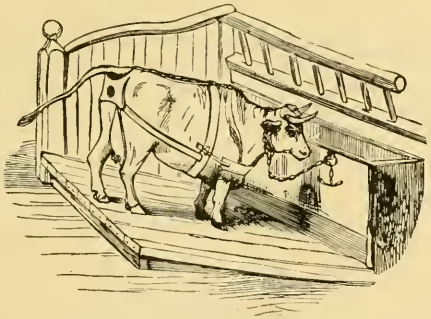
No. 8. 8 Oz. Epsom salts,
½ Oz. Ginger pulverized,
¼ Oz. Caraway seed pulverized,
2. Drachms Copavia.

Give as a drench. If there is a tendency to bleeding, give the following:

No. 9. 2. Oz. Ergot of rye, powdered.

Inversion of the Womb.

This occurs from long-continued and excessive straining, and there hangs from the birthplace a large red or violet colored bag. Clean the



TO PREVENT INVERSION OF THE VAGINA.

bag thoroughly by the free use of warm water. If it is much swollen and enlarged, puncture slightly with the lance in several places to let out engorged blood. When sufficiently reduced, stop the effusion with cold water. Stand the cow so that her head will be permanently lowest in the stall. Let two assistants place a cloth underneath the bag and raise it to the level of the vagina. The operator with his right hand well oiled,

after oiling the surface of the bag, places his hand against the point or bow of the bag farthest from the vagina, presses it steadily but gently back, and as far up the vagina as possible. With the left hand, also oiled, he now presses in the dependent portions in and up in a similar manner. The assistants follow the retracting bag until it is restored. A ball of tow is introduced to keep it in place, and a harness (as shown in the foregoing cut), which includes a raised stall. In any event the bowels should be restrained for a day or two by doses of laudanum. After twenty-four hours, if the pains have ceased and the animal is quiet, the ball of tow may be removed, and later the harness. A simplification of the harness will easily suggest itself to the operator.

Languid Labor.

If the presentation is all right and there is no obstruction, and the mouth of the womb is dilated but the labor pains are infrequent and weak, careful mechanical assistance should be given with the hands as heretofore stated, or try first full doses of ergot of rye, one to two ounces. It is often inefficient in cows and must be given in large doses.

Irritability and Straining.

If this is seen after birth, unless it subsides promptly, or if it show itself by repeated spasms and convulsions, give the following in a quart of warm milk: Chloroform and laudanum, each half an ounce. If the muzzle is dry and the horns hot, showing tendency to fever, the following will be better:

No. 10.
2 Oz. sweet spirits of nitre,
2 Oz. laudanum,
4 Oz. solution of acetate of ammonia.

This dose to be given in a quart of tepid milk every hour until relieved.

Temporary Paralysis.

Cows are frequently paralyzed in their limbs before parturition. If they does not regain the use of their limbs soon, or if they improve slowly, give the following:

No. 11.
2 Drachms powdered nux vomica,
2 Drachms sulphate of iron.

Give in a pint or two of gruel twice a day. Avoid all so-called cleansing drinks; they are generally injurious. When there is unusual debility the following will be indicated:

No. 12.
1 Oz. powdered anise seed,
1 Oz. " myrrh,
1 Oz. " allspice,
1 Oz. " cummiu seed.

To be stirred in a quart of warm gruel as a drench.

If constipation is strong and persistent give:

No. 13.
½ Lb. sulphate of magnesia,
1 Oz. ground anise seed,
6 Oz. olive oil.

Give in a pint of gruel, and repeat daily if needed.

If there is strong relaxation with continued diarrhea, the following will be indicated:

No. 14.
2 Drachms powdered catechu,
1 Oz. " ginger,
30 Drops sulphuric acid,
1 Oz. laudanum.

Give in a quart of gruel, ale or weak whisky and water.

Or,

No. 15.
1 Oz. powdered ginger,
1 Oz. bicarbonate of soda,
1 Oz. laudanum,
1 Oz. decoction of oak bark.

Give several times a day in gruel or ale. Half this dose suffices for six months' calves, in similar conditions of the bowels.

Antiseptic washes for cleansing the vagina when the discharge is foul:

No. 16.
1 Quart clean wood tar,
2 Quarts boiling rainwater.

Stir, settle and pour off.

Another,

No. 17.
1 Lb. chloride of lime,
2 Gallons cool soft water.

Let it settle and pour off clear. A pint or two of either may be injected twice a day.

Abortion.

Abortion may be said to take place in cows when the fœtus is expelled thirty-five days before the normal period. It may occur from a variety

of reasons, and is much more common during the first half of the normal period than in the latter. It may be sporadic, that is, induced by accidental or local causes, as atmospherical influences, such as bad weather, and irregular seasons—severe suddenly succeeding mild weather. Cold storms, etc., are especially to be guarded against. As external causes, access by the male, explorations in vagina, surgical operations, throwing the animal down, bleeding, and bad or improper food, are among the most common of external causes. Excitement, fear, surprise, certain odors, contagion, are credited with playing an active part in this disability. Various diseases are also active parties in this direction. When cases occur simultaneously over wide extents of country and without known causation, it may be enzootic or epizootic. Ravages of this kind are not uncommon, and have even attracted the special attention of veterinarians.

Isolation.

When abortion is about to occur in a stable, at the very first symptom the animal should be entirely separated from the others, and the stall thoroughly disinfected with carbolic acid. In relation to measures preventive and remedial, these will be found in the list of properly labeled drugs to be kept for that purpose; they may be referred to at will. Isolation, however, is of absolute importance, lest the cause extend to other or perhaps all the cows in the stable. Ergot or other fungus spores in the food may be the cause. All possible causes should be carefully examined and remedied. A thorough cleansing of the stables should be made, and disinfectants and fumigants used. The following in the form of powder is good:

No. 18.
1 Bushel air-slacked lime,
1 Pound copperas,
¼ Pound carbolic acid.
Mix.

A liquid form:

No. 19.
1 ¼ Pounds chloride of aluminum,
1 Gallon water.
Dissolve. This is not poisonous.

CHAPTER III.

INFECTIOUS, CONTAGIOUS AND EPIDEMIC DISEASES.

PNEUMONIA.——HISTORY.——ITS MALIGNANT CONTAGIOUSNESS.——DEFINITION.——HOW THE INFECTION ENTERS THE SYSTEM.——HOW LONG IS A DISEASED ANIMAL INFECTIOUS.——HOW TO KNOW IT.——WHAT TO DO.——TEXAS FEVER.——HOW TO KNOW IT.——BLOODY MURRAIN.——ITS MALIGNANT CHARACTER.——PREVENTIVES.——WHAT TO DO.——FOOT AND MOUTH DISEASE.——CONTAGIOUS PLEURA.

Infectious, Contagious and Epidemic Diseases.

Among the most terrible of the diseases ever imported into the United States is *pleuro pneumonia contagiosa* known scientifically by a large number of names, but now generally designated as Bovine Pneumonia Plague, and the Lung Plague in cattle; Texas Fever, known also as Spanish Fever and Texas Cattle Disease, and scientifically as Splenic Fever; Bloody Murrain, also known as "Black Quarter" (Quatran) and "Quarter Ail," is known among veterinarians by its French name *Charbon*, and also as Contagious Anthrax. Thus these will be all that it will be necessary to treat at considerable length as among contagious diseases.

Contagious Pleuro-pneumonia.

This disease which has lately excited so much attention in the United States from its violent outbreak in the Atlantic States, and the well grounded fear that for the lack of national legislation it might overrun the whole country, is the most malignant with which the farmers of the country have had to deal. Once fairly established in the West there

will be no possible means of eradicating it. It will remain a fixture forever.

History.

This disease has been known in Europe and Asia from the remotest civilization, and has been treated since the first gathering together of cattle in large herds. Aristotle, evidently writing of this disease three hundred years before Christ, describes the symptoms accurately, inasmuch as he says: "The cattle *which live in herds* are subject to a malady during which the breathing becomes hot and frequent; the ears droop and they cannot eat. They die rapidly, and the lungs are found spoiled." Greek and Roman writers also describe what appears to be the same disease, and Valentine particularizes a fatal lung plague which evidently corresponds to this malignant and terrible scourge.

Its Malignant Contagiousness.

Unfortunately veterinary science has never yet discovered a remedy. Its attack is so insidious, and often occupies so long a time in the stage of incubation, that a whole herd may be infected almost before it is known. As in the case of all German plagues, nothing is known of its origin; but just as soon as it is apparent that a case is being well developed, the only safe plan is prompt killing, deep burying of the carcass, skin and all, and the free use of quick-lime (a barrel to the carcass) before being covered up.

Definition.

This disease is defined as follows:

A specific contagious disease peculiar to cattle, and manifested by a long period of incubation (ten days to three months) by a slow insidious onset, by a low type of fever, and by the occurrence of inflammation in the air-passages, lungs and their coverings, with an extensive exudation into the lungs and pleuræ.

That the infection is carried by the animals wherever they go is certain. That it is carried in the air to a very considerably extent seems altogether probable. That it is carried by inoculation is well demonstrated; and also by contact of diseased portions of an animal with the membranes of a well one, is as certain as that the contagion is carried by attendants on sick animals and is proved almost beyond controversy. That the contagion will hold in stables for months even after being thoroughly cleaned and washed with disinfectant liquids, is proved just as clearly as that it

may be carried by the many. That it may be taken in pastures and with fodder is too well authenticated to leave room for doubt.

Vitality of the Virus.

There is much difference of opinion with regard to the power of the virus to resist ordinary destructive influences. In many cases the free exposure of an infected place for three or four months to the action of the air has purified it so that fresh stock have been introduced with impunity. On the other hand, instances can be adduced in which cattle have been infected by being placed in stables in which cattle had not been kept at least four months previously. Other things being equal, it will be preserved longest where it has been dried up and covered from the free access of the air. Thus in very dry and close buildings, in those having rotten wood-work, or deep dust-filled cracks in the masonry, and in those with a closed space beneath a wooden floor, it clings with the greatest tenacity. Again, when the buildings contain piles of lumber, litter, hay, fodder, or clothing, the virus is covered up, secreted and preserved for a much longer time than if left quite empty. In these last it is preserved just as it is in woolen or other textile fabrics, and carried from place to place by human beings.

As carried through the air, the distance at which the virus retains its infecting properties varies much with varying conditions. The author has seen a sick herd separated from a healthy one by not more than fifteen yards and a moderately close board fence of seven feet high, and in the absence of all inter-communication of attendants, the exposed herd kept perfectly sound for six months in succession. On the other hand, infection will sometimes take place at a much greater distance without any known means of conveyance on solid objects. Roll quotes 50 to 100 feet, while others claim to have seen infection at a distance of 200 and 300 feet. But it may well be questioned whether in such cases the virus had not been dried up on light objects, like feathers, paper, straw, or hay, which could be borne on the wind. This, from being in thicker layers, would escape the destruction that would have befallen it had it been carried in the air only as invisible particles.

How the Infection Enters the System.

The seat of the disease, its progress, and the result of all attempts at inoculation, favor the presumption that the virus is usually taken in with the air breathed. Not only are the lesions concentrated in the lungs, but they begin with cloudiness and swelling of the smaller air-tubes and surrounding connective tissues.

The exudation into the interlobular tissue, the congestion of the lung tissue itself, and the implication of the lung covering, are secondary phenomena. In other words, the disease begins where the inspired air must lodge the germs. Thus the inoculation of the virulent lung products on distant parts of the body of a sound beast rarely determines the characteristic lesions in the lungs, in lieu of which it induces in the seat of inoculation an exudation less abundant, as might be expected from the greater density and resistance of the integument, but which can, like the morbid lung products, be inoculated on sound animals with protective effect. It seems probable that the poison is multiplied in both cases, but that the special loose and susceptible texture of the lung renders its production incomparably more abundant, as the continuous ingress and egress of air through the diseased organ renders it immeasurably more infecting.

How Long a Diseased Animal is Infectious.

Proof is wanting as to the infectious nature of the disease during the incubative stage. If negative evidence were of any value in a case like this, it would be easy to adduce cases in which the removal of an animal as soon as it showed symptoms of the plague had apparently saved the rest of the herd. In other cases, the malady has been eradicated from a herd by careful watching, and the prompt removal of every animal as soon as sickness appeared. The period of greatest virulence is that at which the fever runs highest and when the lung is being loaded with the morbid exudation.

But it must not be inferred that with the subsidence of the fever the danger is removed. It is a matter of every day observation that animals which have passed through the fever, that are now thriving well, or giving a free supply of milk, and to ordinary observers would appear in perfect health, retain the power of transmitting the disease to others. This may continue for three, six, nine, twelve, or, according to some, even fifteen months after all signs of acute illness have disappeared. This is easily explained. The tendency of the disease is to interrupt the circulation in the most severely affected parts of the lungs; the exudation around this becomes developed into a tough fibrous envelope, which closes off the dead mass from the adjacent lung and from all communication with the external air. The dead and imprisoned mass now undergoes a process of breaking down, liquefaction, and absorption, commencing at the surface, and slowly advancing towards the centre. The encysted portion of the dead lung is one mass of infecting material, and as it undergoes no change except that of liquefaction, and exhales at no time any putrid odor, it remains infectious so long as it retains the solid form. At the outset more than half a lung may be thus encysted, and five or six months after alleged

recovery we still find masses of from one to two pounds weight waiting for the slow process of solution. Whenever there are indications of the existence of such encysted masses, the animal should be looked on as infectious, and disposed of as summarily as if in the acute stages of the disease. Mr. Law gives the following rules when the disease is suspected:

1. Remove all litter, manure, feed and fodder from the stables; scrape the walls and floor—wash them if necessary; remove all rotten wood.

2. Take chloride of lime one-half lb., crude carbolic acid, 4 ozs., and water, 1 gal; add freshly-burned quick-lime till thick enough to make a good whitewash; whitewash with this the walls, roof, floors, posts, mangers, drains and other fixtures in the cow stables.

3. Wash so as to thoroughly cleanse all pails, buckets, stools, forks, shovels, brooms and other movable articles used in the buildings; then wet them all over with a solution of carbolic acid 1-2 lb., water 1 gal.

4. When the empty building has been cleansed and disinfected as above, close the doors and windows, place in the center of the building a metallic dish holding 1 lb. flowers of sulphur; set fire to this and let the cow-shed stand closed until filled with the fumes for at least two hours. The above should suffice for a close stable capable of holding twelve cows. For larger, or very open buildings, more will be required.

5. The manure from a stable where sick cattle have been kept, must be turned over and mixed with quicklime, two bushels to every load; then hauled by horses to fields to which no cattle have access, and at once plowed under by horses.

6. The pits, where the manure has been, must be cleansed and washed with the disinfectant fluid ordered for the building.

7. The surviving herd should be shut up in a close building for half an hour, once or twice a day, and made to breathe the fumes of burning sulphur. Close doors and windows, place a piece of paper on a clean shovel, lay a few pinches of flowers of sulphur upon it, and set it on fire; adding more sulphur, pinch by pinch, as long as the cattle can stand it without coughing. Continue for a month.

8. Give two drachms powdered copperas (green vitriol) daily to each cow in meal or grains; or, divide 1 lb. copperas into 50 powders, and give one daily to each adult animal.

9. Do not use for the surviving cattle any feed, fodder or litter that has been in the same stables with the sick. They may safely be used for horses and sheep.

What to Do.

There is only one remedy—entire isolation of the herd infected. The prompt killing and slashing of the hides of diseased animals, deep burial,

and covering the bodies with quick-lime. It may be stamped out only by the free use of the poll-axe, and the thorough disinfection by the most severe means of the premises, utensils and attendants. It is one of those cases where heroic treatment is of supreme value.

How to Know It.

The symptom most easily known in the early stage is an increased temperature of the body. If a clinical thermometer be introduced into the rectum of a beast in an infected district, and an abnormal heat is ascertained, it is safe to suspect the disease; therefore send for a veterinarian at once. Next a slight cough will show itself; the hair will be erected along the back; there may be shivering and always tenderness of the back when pinched; the breathing and pulse is accelerated; the bowels are costive, rumination is irregular. The urine is scanty and high colored, the appetite fails, the milk-flow is diminished, the nose will be alternately moist and dry. The horns and other extremities will be alternately hot and cold. In the field, the sick animals will separate from the herd. All the symptoms become more and more apparent until the animal remains in a fixed posture, the head rigidly extended, the mouth open, at every inspiration a moan, until at length the animal succumbs, a loathsome and noxious mass of contagion.

What to Do.

A resort to remedies should not be had unless the animals are taken early in hand, and can be isolated in a building far from any herd. It will not pay except in the case of thorough-bred or otherwise valuable stock. This is especially the case in the West, if that section should be unfortunate enough to import the disease. Prof. Gamgee, who made an elaborate report for the Government in 1871, strongly and wisely condemns purgatives and bleeding, but believes the disease may be checked, if taken in time, by isolating the whole herd, and depending on active internal astringents. He advises daily doses of sulphate of iron, one-half to one drachm to the bullock, mixed with an equal weight of linseed and coriander seeds, given in bran to disguise it: this he has found to mitigate the cough, followed by the disappearance of the disease.

In the second stage of the disease, he advises light but nutritious food, copious warm water injections, and the following stimulant:

No. 20. ½ Oz carbonate of ammonia,
1 Qt. linseed oil.

Mix, and give this dose two or three times a day. When only one lung is involved, recovery occasionally takes place; when both are involved, there is little or no hope. For cough and debility during convalescence, he advises the following tonic:

No. 21.
¼ Oz. oxide of magnesia,
½ Oz. iron filings, fine,
1½ Oz. tincture of gentian,
1 Pt. water.
To be given daily.

Another prescription is recommended—

No. 23.
1 Drachm carbolic acid,
1 Pint water
To be given as a dose three times a day.

The reader will see, upon a careful study of the foregoing, that but one prescription—killing—is the only safe plan.

Texas Fever.

This disease, now called Splenic Fever, resembles in some of its phases the terrible Rinderpest of Asiatic Russia, but it is far less malignant and less contagious. It also disappears with the first frost, being effectually stamped out during the Winter, not to be again seen until again reintroduced by the passage of Texas cattle. So again it is not given by our Northern cattle to other beasts. The disease has its home on the coast of Texas, but how it originated is not clearly known. After death the spleen is found greatly enlarged and softened, the kidneys broken, dung and the blood fluid.

How to Know It.

The period of incubation extends over four or five weeks after the poison has been introduced. The fever will at first be moderate, the temperature as shown by a clinical thermometer, introduced into the rectum, will be 103 to 107 degrees. Then follows dullness, cough, trembling, jerking of the muscles, drooping of the head, arching of the back. The horns are hot, rumination ceases, and the appetite not good. The eyes become glassy and watery, the urine deep red or black from the blood contained; the dung is hard and coated with blood; the mouth and rectum will be a dark red or copper color; and the animal dies in a stupor or convulsions.

Gamgee always found present in the examination of nearly 5,000 animals that the fourth stomach was distinctly inflamed and the spleen

always enlarged and of a purplish color—on cutting the pulp oozing out soft like currant jelly. Hence the name, "Splenic Fever."

What to Do.

Put the animal in a roomy stable with good ventilation, and give soft food. As an internal remedy give

No. 23. ½ Oz. chlorate of potash,
1 Oz. tincture of chloride of iron,
1 Quart water.
Mix and give as a dose to to be followed two or three times a day.

The most dangerous symptoms being passed, give plentiful food and the following tonic.

No. 24. ½ Oz. sulphate of iron,
1 Oz. tincture of ginger,
1 Qt. water.
This amount twice daily.

Professor Gamgee does not regard medical treatment as being hopeful. In addition he advises that the limbs be well rubbed, and the bowels moved by injections. During the first two or three days he recommends ounce doses of laudanum, and later as a stimulant the following:

No. 24. ½ Oz. sulphuric ether,
4 Oz. of acetate of ammonia.
Give in a quart of linseed tea three times a day.

Bloody Murrain.

Contagious Anthrax, known also as charbon, black leg, black quarter, black tongue— is so called because the parts attacked turn black, owing to decomposition of the blood. It arises undoubtedly from contagion, eating bad food, pasturing on swamp lands in summer, drinking stagnant water, etc. Whatever the poison, certain it is it has wonderful tenacity of life; every part of the animal will carry it, even the excrement. Flies will carry it, a yoke worn by a diseased ox retains it. Even alcohol is said not be able to kill the poison. Fortunately it rarely occurs in its truly malignant form. There are many types of the disease attacking particular parts. In the tongue it is known as black tongue, or blain; in the throat as putrid sore throat. When it attacks the bowels it is called bloody murrain.

Its Malignant Character.

In this disease it must be remembered that in its malignant form it attacks not only cattle and horses, but all the herbivora, swine and birds. It is communicable to other and different animals by inoculation, showing itself in different forms, but all characterized by the breaking down of the blood globules, rupture of tissues and letting out blood and albuminous fluids, with gangrene, yellow or brown mucous membrane, enlargement and sometimes rupture of the spleen, and a very high death rate. Immense numbers of human beings have died first and last from eating the flesh of diseased animals. This is especially the case among the Tartars, who do not refrain from eating even the flesh of anthrax horses. As many as a thousand persons are recorded as having died in six weeks in San Domingo from eating the flesh of such diseased animals. Mosquitoes, and other biting insects are supposed to cause breaking out of the malignant pustule in man, from the fact of its always arising on exposed portions of the body. In relation to the various manifestations of the malignant anthrax Professor Law says:

"Malignant anthrax may be manifested by external disease, or swelling or without such appearances. To the first class belong the carbuncular, erysipelas, of sheep and swine, malignant sore throat of hogs, gloss-anthrax or black tongue, black quarter or bloody murrain, the boiled plague of Siberia, and the malignant pustule of man. To the second belong all those forms of disease in which there are the specific changes in blood, with engorgement of the spleen, blood-staining, and exudations into internal organs only.

Preventives.

Upon the first intimation of the disease the well animals of the herd should be removed to clean, new pasture, where there is pure water. Avoid all bleeding, purging, and lowering medicines. The animals must be kept up. So all local applications to the swellings seem useless. A seton, composed of a yard of broad coarse tape, inserted in the dewlap turned every day and smeared with irritating ointment might prove beneficial. This should remain in from four to six weeks.

Youatt and others advise the following:

No. 25.
2 to 4 Drachms chloride of lime,
1 Oz. prepared chalk,
2 Drachms laudanum.
Mix and give in a pint of warm gruel every two or three hours.

Recent French authors, in treating the malignant form of the disease,

recommend quinine, one or two drachms, repeated every two or three hours in severe cases. Also hypodermic injections of a solution of iodine as follows:

No. 26. 2 Grains iodine,
5 Grains iodide of potassium,
1 Oz. water.

Use a syringeful every hour in severe cases. In extreme ones, it is advised that this be thrown directly into the veins; also that the strength be kept up by stimulants; among those recommended most strongly is carbonate of ammonia.

Blain.

When bloody murrain attacks the tongue it is called blain. In the case of blain it is recommended to open the pustule freely from end to end, with a sharp lancet, before the poison has been absorbed. Treat the same surface freely with the following:

No. 27. 20 Grains chloride of lime,
1 Oz. water.

Mop the parts freely.

Sulphuric or nitric acid, nitrate of mercury, lunar caustic, and other strong caustics, are equally good. When it may be accomplished, burning with a hot iron is advised.

Foot and Mouth Disease.

One other contagious disease will be necessary to be treated of here, as beginning to be of common occurrence, having prevailed more or less since its introduction into the United States in 1869. This is epizootic aptha, generally known as foot and mouth disease. Although a contagious febrile disease occurring in cattle and sheep, and communicable by transmission to swine and even man, it is fortunately rarely fatal, and is characterized in animals by an eruption of small blisters in the mouth, and between the clefts of the hoofs, and along the upper margin of the coronet. It is a specific poison of obscure origin, remaining in the system from one to four days before producing its characteristic symptoms.

How to Know It.

There is an increase of temperature in the body, followed by an eruption of small blisters, of the size of a dime, situated on the tongue, the roof of the mouth, inside the lips, and occasionally on the udder. The

blisters in the cleft of the hoofs and around the coronet and heels, are indentical with the others, but smaller.

Malignant Catarrh.

Caused by feeding in damp, cold situations, and feeding on marshes in peculiar seasons. Low, wet river bottoms are most subject to give it to stock. The disease somewhat resembles the Russian cattle plague, but is not usually contagious. Professor James Law gives symptoms and treatment as sollows:

A slight diarrhœa may be followed by costiveness, the dung being black, firm and scanty. The hair is rough and erect; shivering ensues; the head is depressed; the roots of the horns and forehead hot; eyes sunken, red, watery, with turbidity in the interior and intolerance of light; muzzle dry and hot; mouth hot with much saliva; the membranes, mouth, nose and

MALIGNANT CATARRH—SECOND OR SLOUGHING STAGE.

vagina bluish-red; pulse rapid; impulse of the heart weak; breathing hurried; cough; urine scanty and high colored, and surface of the body alternately hot and cold. In twenty-four hours all the symptoms are aggravated; the nose discharges a slimy fluid; forehead is warmer and duller on percussion; the mouth covered with dark red blotches, from which the cuticle soon peels off, leaving raw sores; appetite is completely lost; dung and urine passed with much pain and straining, and there is generally stiffness and indisposition to move. From the fourth to the sixth day ulcers appear on the nose and muzzle, swellings take place beneath the jaws, chest and abdomen, and on the legs the skin may even slough off

in patches; a fœtid saliva drivels from the mouth and a stinking diarrhœa succeeds the costiveness. Death usually ensues from the eighth to the tenth day, preceded perhaps by convulsions or signs of suffocation.

The treatment is to clean the bowels with the following:

No. 28. 1 Pint olive oil,
1 Oz. laudanum.
Mix.

In eight or ten hours, if it do not operate, give another. Follow this with diuretics, sweet spirits of nitre in half-ounce doses, and also with antiseptics, potassa chlorate, in doses of one-quarter drachm. Wet cloths should be kept on the head; the mouth and nose sponged with quite a weak solution of carbolic acid. Give as food only soft mashes.

CHAPTER IV.

MEDICINES AND INSTRUMENTS—WHAT TO KEEP.

I. DISSECTION.—— II. ACTION OF MEDICINES. —— III. MEDICINES TO BE KEPT, AND DOSES. ——IV. SIMPLE AND VALUABLE RECIPES.——V. FORMS OF CLYSTERS.——VI. INFUSIONS. ——VII. ANTI-SPASMODICS. —— VIII. FOMENTATIONS.——IX. MUCILAGES.—— X. WASHES. ——XI. POULTICES.——XII. FUMIGATIONS.——XIII. TINCTURE FOR WOUNDS.

I. Dissection.

In the dissection of cattle the axe and meat saw, and butcher's knife must be largely depended on, in the hands of farmers, since all that is necessary is to get at the diseased parts to note their appearance and the seat of the disease, the symptoms having been previously carefully noted. This matter has been treated of in diseases of the horse, chapter XIX., article Dissection, to which the reader is referred.

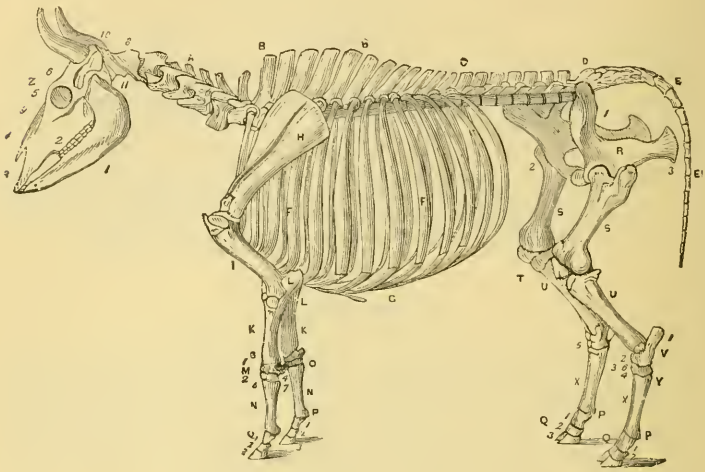
II. Action of Medicines.

The action of medicines, doses for horse, ox, sheep and swine is also treated of in chapter XIX., of the horse, together with much other valuable matter applicable to animals generally.

III. Medicines to be Kept, and Doses.

It will not be necessary to keep more than a small stock of the medicines in most common use, or such as may be required in an emergency. Those adapted to the horse, will, as a rule be also adapted to other stock. In chapter XIX. a pretty full list will be found, with the appropriate doses for cattle, sheep and swine, as well as the horse; also the proper proportionate dose for animals of various ages up to the adult. It will not be necessary to repeat them here.

For the purpose of enabling our readers to become familiar with the bony structure of cattle we give an illustration of the skeleton of the ox with the correct names of the various parts as known in veterinary science. It will be found valuable for reference, not only to the student in veterinary art, but also to every one who proposes to keep and breed cattle.



SKELETON OF THE OX.

Explanation of Cut.—*A*—Cervical Vertebrae. *B B*—Dorsal Vertebrae. *C*—Lumbar Vertebrae. *D*—Sacrum. *E E*—Coccygeal Bones. *F F*—Ribs. *G*—Costal Cartilages. *H*—Scapula. *I*—Humerus. *K K*—Radius. *L*—Ulna. *M*—Carpus or Knee. 1—Scaphoid. 2—Semilunar. 3—Cuneiform. 4—Trapezium. 5—Trapezoid. 6—Os Magnum. 7—Unciform. 8—Pisiform. *N N*—Large Metacarpel or Cannon. *O*—Small Metecarpel. *P P*—Sesamoid Bones. *Q Q*—Phalanges. 1—Os Suffraginis or Pastern Bone. 2—Os Coronae. 3—Os Pedis. *R*—Pelvis. 1—Illium. 2—Pubis. 3—Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hocks. 1—Os Calcis. 2—Ostragulus. 3—Cuneiform Magnum. 4—Cuneiform Median. 5—Cuneiform Parvum. 6—Cuboid. *X*—Large Metatarsal. 1, 2, 3—Phalanges. *Y*—Small Metatarsal. *Z*—Head. 1—Inferior Maxilla. 2—Superior Maxilla. 3—Anterior Maxilla. 4—Nasal Bone. 5—Molar. 6—Frontal. 7—Parietal. 8—Occipital. 9—Lachrymal. 10—Squamous. 11—Petrous.

In comparing the skeleton of the ox with that of the horse, we can readily perceive the difference in the length of the limb and neck possessed by the latter. Speed seems to have been an object at the creation, and as the body was elevated the neck needed proportionate length in order to feed. The body of the horse corresponds to a square, while that of the ox to a long rectangle. The limbs of the ox are straighter than those of the horse, much less speed being demanded. The ribs of the former are both longer and larger than those of the latter, greater protection with sluggardness of movement being required. In the head of the ox we find the two plates or tables noticed in the horse; in the latter, however, they lie close together, while in the former, as in all horned animals, there is considerable space between them. This diversity creates a number of cells, having bony ridges passing from the inner to the outer plate, which secures the firmness of the parts. These cells form roomy and strong sockets for the horns. The cavity containing the brain of the ox is about one-fourth the size of the other parts of the skull; the organs of mastication and those of smell taking up the remaining portions. In cattle the frontal bones extend from the nose to the superior ridge of the skull, presenting a flat, irregular surface, totally bare of any muscular or fleshy covering. The weapon of defense and offense employed by cattle is the horn and nature has securely based it and rendered it effective by this expanse of the frontal bone. There is the same division in the center of the frontal sinuses as in the horse, but the perfection of division between the nostrils is wanting. Commencing about half way up the nose, the septum is wanting at the lower part, and the two nostrils are, as it were, thrown into one; the frontal sinuses connect with the nasal, thus forming a continuous cavity from the muzzle to the horn, and from one muzzle to the other. In polled cattle the frontal bone holds the same situation—reaching from the nasal bones to the parietal ridge—but as they were not designed for the base of horns, they narrow off towards the poll. The temporal bones in cattle are small, deep in the temporal fossa and destitute of the squamous structure. The occipital bone is, in the ox, deprived of almost all the importance attached to it in the conformation of the horse. The sphenoid and ithmoid bones are in the same relative position.

IV. Simple and Valuable Medical Recipes for Cattle.

Dr. G. H. Dadd, M.D., V S., a medical practitioner of repute, and celebrated as a veterinary surgeon, up to the time of his death, some fifteen years ago, attributed much of his success to not being bound by any rigid rules of practice. Thus he, while having been bred under the Allopathic system of medicine, used largely of botanical agents, as in

fact do all our best physicians now, more largely than formerly. In the appendix to his work on the diseases of cattle he gives a series of recipes under appropriate headings, which we reproduce in a somewhat different and condensed form, as being at the same time simple and efficacious. In his observations on the action of medicine, and external agents on the animal body, he says, that warmth and moisture always expand it, and bayberry bark, tannin, and gum catechu always contract it; and that these agents have these effects at all times (provided, however, there be sufficient vitality in the part to manifest these peculiar changes) and under all circumstances. If a blister be applied to the external surface of an animal, and it produces irritation, it always has a tendency to produce that effect, whatever part of the living organism it may be applied to. So alcohol always has a tendency to stimulate, whether given by the mouth or rubbed on the external surface, it will produce an excitement of nerves, heart and arteries, and of course the muscles partake of the influence. Again, marsh mallows, gum acacia, slippery elm, etc., always lubricate the mucous surfaces, quiet irritation, and relieve inflammatory symptoms.

It follows, of course, 1st. That when any other effects than those just named are seen to follow the administration of these articles, they must be attributed to the morbid state of the parts to which they are applied; 2d. That a medicine which is good to promote a given effect in one form of disease, will be equally good for the same purpose in another form of disease in the same tissue. Thus, if an infusion of mallows is good for inflammation of the stomach, and will lubricate the surface, and allay irritation in that organ, then it is equally good for the same purpose in inflammation of the bowels and bladder. What we wish the reader to understand is this: that a medicine used for any particular symptom in one form of disease, if it be a sanative agent, is equally good for the same symptom in every form.

The medicines we recommend owe their diuretic, astringent, diaphoretic and cathartic powers to their aromatic, relaxing, antispasmodic, lubricating and irritating properties; and if we give them with a view of producing a certain result, and they do not act just as we wish, it is no proof that they have not done good. The fact is, all our medicines act on the parts where nature is making the greatest efforts to restore equilibrium; hence they relieve the constitution, whatever may be the nature of their results.

V. Forms of Clysters.

Laxative clyster:

No. 29. 3 or 4 Quarts warm water,
8 Ounces linseed oil,
1 Table-spoonful common salt (fine).

Another:

No. 30. 4 Quarts warm water,
1 Gill soft soap,
½ Table-spoonful fine salt.

Useful in obstinate constipation, "stoppage," or whenever the excrement is hard and dark colored.

Emollient clyster:

No. 31. 2 Ounces slippery elm bark,
2 Quarts boiling water.

Simmer over the fire a few minutes, strain through a fine sieve, and inject, when nearly cool. The following articles may be substituted for elm: flaxseed, lily roots, gum arabic, poplar bark, Iceland moss.

Use.—In all cases of irritation and inflammation of the intestines and bladder.

Stimulating clyster:

No. 32. 3 Quarts of thin mucilage of slippery elm or linseed tea,
1 Teaspoonful African cayenne, pure.

Another:

No. 33. ½ Table-spoonful powdered ginger,
3 Quarts boiling water.

When cool, inject.

Use.—In all cases when the rectum and small intestines are inactive and loaded with excrement, or gas.

Anodyne clyster:

No. 34. 1 Ounce lady's slipper (cypripedium),
1 Ounce camomile flowers,
3 Quarts boiling water.

Let the mixture stand a short time, then strain through a fine sieve when it will be fit for use.

Use.—To relieve pain and relax spasms.

Diuretic clyster:

No. 35. 3 Quarts linseed tea,
1 Table-spoonful oil of juniper.

Or, substitute for the latter, cream of tartar, half an ounce.

Use.—This form of clyster may be used with decided advantage in all acute diseases of the urinary organs. This injection is useful in cases of red water, both in cattle and sheep; and when the malady is supposed to

result from general or local debility, the addition of tonics (golden seal or gentian) will be indicated. Their active properties may be extracted by infusion.

Astringent clyster:

Take an infusion of hardhack, strain, and add a table-spoonful of finely-pulverized charcoal to every three quarts of fluid.

Another is an infusion of witch hazel.

Another:

No. 36. 1 Table-spoonful powdered bayberry bark,
3 Quarts boiling water.

When cool, it is fit for use.

Use.—Astringent injections are used in all cases where it is desired to contract the living fibre, as in scouring, dysentery, scouring rot, diarrhea, bloody flux, falling of the womb, fundament, etc.

Nourishing clysters:

Nourishing clysters are composed of thin gruel made from flour, etc.

Injection for worms:

Make an infusion of pomegranate (rind of the fruit), and inject every night for a few days. This will rid the animal of worms that infest the rectum: but if the animal is infested with the long, round worm (*teres*), then half a pint of the above infusion must be given for a few mornings, before feeding.

Another for worms:

No. 37. 1 Ounce powdered lobelia,
1 Handful wood ashes,
3 Quarts boiling water.

When cool, it is fit for use.

VI. Infusions.

These are made by steeping herbs, roots, and other medical substances in boiling water. No particular rules can be laid down as to the quantity of each article required. It will, however, serve as some sort of a guide, that we generally use from one to two ounces of the aromatic herbs and roots to every quart of fluid. A bitter infusion such as wormwood or camomile requires less of the herb. All kinds of infusions can be rendered palatable by the addition of a small quantity of honey or molasses. As a general rule, the human palate is a good criterion; for if an infusion be too strong or unpalatable for a man, it is unfit for cattle or sheep.

An infusion of either of the following articles is valuable in colic, both flatulent and spasmodic, in all classes of animals: caraway, peppermint,

spearmint, fennel seed, angelica, bergamot, snake root, anise seed, ginseng, etc.

VII. Anti-spasmodics.

By anti-spasmodics are meant those articles that assist, through their physiological action in relaxing the nervous and muscular systems.

VIII. Fomentations.

This class of remedies is usually composed of relaxants, etc., of several kinds, combined with tonics, stimulants, and anodynes. They are very useful to relieve pain, to remove rigidity, to restore tone, and to stimulate the parts to which they are applied.

Common fomentation:

No. 38. 1 Part wormwood,
1 Part tansy,
1 Part hops.

Moisten them with equal parts of boiling water and vinegar, and apply when blood warm.

Use.—For all kinds of bruises and sprains. They should be confined to the injured parts, and kept moist with the superabundant fluid. Where it is not practicable to confine a fomentation to the injured parts, as in shoulder or hip lameness, constant bathing with the decoction will answer the same purpose.

Anodyne fomentation:

No. 39. 1 Handful of hops,
1 Ounce white poppy heads,
Equal parts water and vinegar.

Simmer a few minutes.

Use.—In all painful bruises.

Relaxing fomentation:

No. 40. 2 Ounces powdered lobelia,
2 Quarts boiling water.

Simmer for a few minutes, and when sufficiently cool, bathe the parts with a soft sponge.

Use.—In all cases of stiff joints, and rigidity of the muscles.

Cedar buds, or boughs, any quantity, to which add a small quantity of red pepper and ginger, with boiling water sufficient.

Use.—Efficacious in chronic lameness and paralysis, for putrid sore throat, and when the glands are enlarged from cold and catarrh.

IX. Mucilages.

Mucilages are soft, bland substances, made by dissolving gum arabic in hot water; or by boiling marsh mallows, slippery elm, or lily roots, until their mucilaginous properties are extracted. A table-spoonful of either of the above articles, when powdered, will generally suffice for a quart of water.

Use.—In all cases of catarrh, diarrhœa, inflammation of the kidneys, womb, bladder, and intestines. They shield the mucous membranes, and defend them from the action of poisons and drastic catharties.

X. Washes.

Washes generally contain some medical agent, and are principally used externally.

Wash for diseases of the feet:

No. 41. 4 Ounces pyroligenous acid,
8 Ounces water.

Use—This wash excels any other in point of efficacy, and removes rot and its kindred diseases sooner than any other.

Cooling wash for the eye:

No. 42. 1 Pint rain water,
20 Drops acetic seed.

Use.—In ophthalmia.

Tonic and anti-spasmodic wash:

No. 43. ½ Ounce camomile flowers,
1 Pint boiling water.

When cool, strain through fine linen.

Use.—In chronic diseases of the eye, and when a weeping remains after an acute attack.

Wash for unhealthy or ulcerated sores:

A weak solution of soda or wood ashes.

Wash for diseases of the skin:

Take one ounce of finely-pulverized charcoal, pour on it one ounce of pyroligenous acid, then add a pint of water. Bottle, and keep it well corked. It may be applied to the skin by means of a sponge. It is also an excellent remedy for ill-conditioned ulcers.

Physic for cattle:

No. 44. ½ Ounce extract of butternut (juglans cinerea),
1 Tea-spoonful cream of tartar,
2 Quarts boiling water.

Mix. When cool, administer.

Another:

No. 45. ½ Ounce extract of blackroot (leptandra virginica),
1 Ounce Rochelle salts,
½ Tea-spoonful powdered ginger.

Dissolve in two quarts of warm water.

Another:

No. 46. 1 Table-spoonful powdered mandrake,
1 Tea-spoonful cream of tartar
2 Quarts hot water.

Here are three different forms of physic for cattle, which do not debilitate the system, like aloes and salts, because they determine to the surface as well as the bowels. They may be given in all cases where purges are necessary. One-third of the above forms will suffice for sheep.

Mild physic for cattle:

No. 47. 2 Ounces syrup of buckthorn,
½ Table-spoonful sulphur,
½ Tea-spoonful ginger,
2 Quarts hot water.

Aperient:

No. 48. 1 Pint linseed oil,
Yolks of 2 eggs.

Mix.

Another:

No. 49 1 Pint sweet oil,
½ Tea-spoonful powdered cayenne.

Mix.

A sheep will require about one-half of the above.

Stimulating tincture:

No. 50. 1 Pint boiling vinegar,
2 Ounces tincture of myrrh,
2 Teaspoonfuls powdered capsicum.

Use.—For external application in putrid sore throat.

Another:

No. 51. 4 Ounces tincture of camphor,
½ Ounce oil of cedar,
4 Ounces tincture of capsicum (hot drops).

To be rubbed around throat night and morning.

Stimulating tincture for chronic rheumatism:

No. 52. 4 Ounces tincture of capsicum,
1 Ounce oil of cedar,
1 Ounce oil of wormwood,
½ Pint vinegar,
1 Gill goose grease.

Mix. To be applied night and morning. The mixture should be kept in a well corked bottle, and shaken before being used.

XI. Poultices.

If a foreign substance enters the flesh the formation of matter is a part of the process by which nature rids the system of the enemy. A poultice relaxing and lubricating will then be indicated. If, however, the foreign body shall have entered at a point where it is impossible to confine a poultice, then the suppurative stage may be shortened by the application of relaxing fomentations, and lastly by stimulants.

Mr. Cobbett says of marsh mallow plant: It is among the most valuable that ever grew. Its leaves stewed, and applied wet, will cure, and almost instantly ease, any cut, or bruise, or wound of any sort. Poultices made of it will cure sprains; fomenting with it will remove swellings; applications made of it will cure chafes made by saddle and harness: and its operation, in all cases, is so quick that it is hardly to be believed. Those who have this weed at hand need not put themselves to the trouble and expense of sending to doctors and farriers on trifling occasions.

If the use of this weed was generally adopted the art and mystery of healing wounds, and of curing sprains, swellings, and other external maladies, would very quickly be reduced to an unprofitable trade.

Lubricating and healing poultices:

No. 53. 1 Part powdered marsh mallow roots,
1 Part marsh mallow leaves.

Moisten with boiling water, and apply.

Use.—In ragged cuts, wounds and bruises.

Stimulating poultice:

No. 54. 1 Part Indian meal,
1 Part slippery elm.

Mix them together, and add sufficient boiling water to moisten the

mass. Spread it on a cloth, and sprinkle a small quantity of powdered cayenne on its surface.

Use.—To stimulate ill-conditioned ulcers to healthy action. Where there is danger of putrescence add a small quantity of powdered charcoal.

Poultice for bruises:

Nothing makes so good a poultice for recent bruises as boiled carrots or marsh mallows.

Poultice to promote suppuration:

No. 55 A sufficient quantity of Indian meal,
1 Handful of linseed,
1 Teaspoonful of cayenne.

To be moistened with vinegar and applied at the usual temperature.

Stypties to arrest bleeding:

Witch hazel, (Winter bloom,) bark or leaves, 2 ounces.

Make a decoction with the smallest possible quantity of water, and if the bleeding is from the nose, throw it up by means of a syringe; if from the stomach, lungs, or bowels, add more water, and let the animal drink it, and give some by injection.

Styptic to arrest external bleeding:

Wet a piece of lint with tincture of muriate of iron, and bind it on the part.

There are various other stypties, such as alum water, strong tincture of nutgalls, bloodroot, common salt, fine flour, etc.

Absorbents:

Absorbents are composed of materials partaking of an alkaline character, and are used for the purpose of neutralizing acid matter. The formation of an acid in the stomach arises from some derangement of the digestive organs, sometimes brought on by the improper quantity or quality of the food. It is useless, therefore, to give absorbents, with a view of neutralizing acid, unless the former are combined with tonics, or agents that are capable of restoring the stomach to a healthy state.

A mixture of chalk, salaratus, and soda is often given by farmers: yet they do not afford permanent relief. They do some good by correcting the acidity of the stomach, but the animals are often affected with diarrhea or costiveness, loss of appetite, colic, and convulsions. Attention to the diet would probably do more good than all the medicine in the world. Yet, if they do get sick, something must be done. The best forms of absorbents are the following: they restore healthy action to the lost function, at the same time that they neutralize the gas:

Forms of absorbents:

No. 56.
1 Table-spoonful powdered charcoal,
½ Table-spoonful powdered snakeroot,
1 Tea-spoonful powdered caraways,
1 Quart hot water.

Mix. To be given at one dose for a cow; half the quantity, or indeed one-third, is sufficient for a calf, sheep or pig.

Another:

No. 57.
1 Table-spoonful powdered charcoal.

To be given in thoroughwort tea, to which may be added a very small portion of vinegar.

Another, adapted to city use:

No. 58.
1 Tea-spoonful sub-carbonate of soda,
1 Ounce tincture of gentian,
1 Pint infusion of spearmint.

Mix. Give a cow the whole at a dose, and repeat daily, for a short time, if necessary. One-half the quantity will suffice for a smaller animal.

Drink for coughs:

No. 59.
½ Ounce balm of Gilead buds,
2 Table-spoonfuls honey,
1 Wine-glassful vinegar,
1 Pint water.

Set the mixture on the fire, in an earthen vessel; let it simmer a few minutes. When cool, strain, and it is fit for use. Dose, a wine-glassful twice a day.

Another:

No. 60.
1 Ounce balsam copaiba,
1 Ounce powdered licorice,
2 Table-spoonfuls honey,
1 Quart boiling water.

Rub the copaiba, licorice and honey together in a mortar; after they are well mixed, add the water. Dose, half a pint, night and morning.

Another:

No. 61.
½ Ounce balsam of Tolu,
1 Ounce powdered marshmallow roots,
½ Gill honey,
2 Quarts boiling water.

Mix. Dose, half a pint, night and morning.

Drink for a cow after calving:

No. 62. 1 Ounce bethwort,
1 Ounce marshmallows.

First make an infusion of bethwort by simmering it in a quart of water. When cool, strain, and stir in the mallows. Dose, half a pint, every two hours.

Diuretic:

Bearberry (*uva ursi*), is a popular diuretic, and is useful when combined with marshmallows. When the urine is thick and deficient in quantity, or voided with difficulty, it may be given in the following form:

No. 63. 1 Ounce powdered bearberry,
2 Ounces powdered marshmallows,
2 Pounds Indian meal.

Mix. Dose, half a pound daily, in the cow's feed.

Eruption wash:

Borax is a valuable remedy for eruptive diseases of the tongue and mouth. Powdered and dissolved in water, it forms an astringent, antiseptic wash. The usual form is:

No. 64. ½ Ounce powdered borax,
2 Ounces honey.

Mix.

XII. Fumigations.

For foul barns and stables, take,

No. 65. 4 Ounces common salt,
1½ Ounce manganese.

Let these be well mixed, and placed in shallow earthern vessel: then pour on the mixture, gradually, sulphuric acid, four ounces. The inhalation of the gas which arises from this mixture is highly injurious; therefore, as soon as the acid is poured on, all persons should leave the building, which should immediately be shut, and not opened again for several hours. Dr. White, V.S., says, "When glanderous or infectious matter is exposed to it a short time, it is rendered perfectly harmless."

Ulceration of the mouth:

A strong infusion of goldthread (*coptis trifolia*), makes a valuable application for eruptions and ulcerations of the mouth. We use it in the following form:

No. 66. 1 Ounce goldthread,
1 Pint boiling water.

Set the mixture aside to cool; then strain, and add a table-spoonful of honey, and bathe the parts twice a day.

Astringent:

Kino is a powerful astringent, and may be used in diarrhea, dysentery, and red water, after the inflammatory symptoms have subsided. We occasionally use it in the following form for red water and chronic dysentery:

No. 67. 20 Grains powdered kino,
1 Quart thin flour gruel.

To be given at a dose, and repeated night and morning, as occasion requires.

Simple cough remedy:

The following makes an excellent cough remedy:

No. 68. 1 Ounce powdered licorice,
1 Tea-spoonful balsam of Tolu,
1 Quart boiling water.

To be given at a dose.

Antacid for hoven:

Lime water is used in diarrhœa, and when the discharge of urine is excessive. Being an antacid, it is very usefully employed when cattle are hoven or blown. It is unsafe to administer alone, as it often deranges the digestive organs; it is therefore very properly combined with tonics. The following will serve as an example:

No. 69. 2 Ounces lime water,
2 Quarts infusion of snakehead (balmony),

Dose, a quart, night and morning.

XIII. Tincture for Wounds.

Myrrh makes an excellent tincture for wounds, prepared as follows:

No. 70. 2 Ounces powdered myrrh,
1 Pint proof spirits.

Set in a close covered vessel for two weeks, then strain through a fine seive, and bottle for use. It should be always kept on hand.

Opodeldoc:

Used for strains and bruises, after the inflammatory action has somewhat subsided.

Liquid opodeldoc:

No. 71. 6 Ounces soft soap,
1½ Pints New England rum,
½ Pint vinegar,
2 Ounces oil of lavender.

The oil of lavender should first be dissolved in an equal quantity of alcohol, and then added to the mixture.

Mucilages for catarrh, etc.:

We have given pleurisy root, (*asclepias tuberosa*), a fair trial in cattle practice, and find it to be invaluable in the treatment of catarrh, bronchitis pleurisy, pneumonia and consumption. Take:

No. 72. ½ Table-spoonful powdered pleurisy root,
1 Ounce powdered marshmallow roots.

Boiling water sufficient to make a thin mucilage. The addition of a small quantity of honey increases its diaphoretic properties.

For eruptive diseases:

The bark of sassafras root is stimulant, and possesses alterative properties. Used in connection with sulphur, for eruptive diseases, and for measles in swine, in the following proportions, it will be found valuable:

No. 73. 1 Ounce powdered sassafras,
1-2 Table-spoonful powdered sulphur.

Mix, and divide into four parts, one of which may be given night and morning, in a hot mash.

PART V.

SHEEP AND SHEEP HUSBANDRY.

ORIGIN, BREEDS, CHARACTERISTICS AND MANAGEMENT.

SHEEP AND SHEEP HUSBANDRY.

CHAPTER I.

ORIGIN, PRINCIPAL BREEDS AND CHARACTERISTICS.

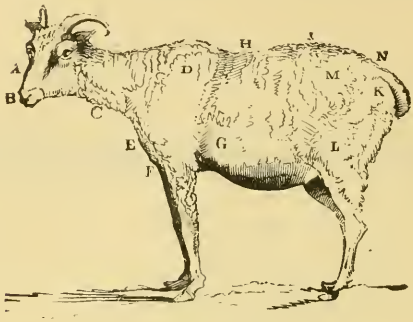
COSMOPOLITAN NATURE OF SHEEP. — LONG-WOOLED SHEEP.——I. LEICESTER.——II. BORDER LEICESTER.——III. COTSWOLD.—GOOD QUALITIES OF COTSWOLDS.—COTSWOLDS IN THE WEST.——IV. LINCOLN SHEEP.——V. NEW OXFORDSHIRE SHEEP. —— VI. MIDDLE WOOLED SHEEP. —— VII. CHEVIOT SHEEP. —— VIII. WHITE-FACED HIGHLAND SHEEP.——IX DORSET SHEEP. — X. SOUTHDOWNS. ——XI. HAMPSHIRE DOWNS. —— XII. SHROPSHIRE DOWNS. —— XIII. OXFORD DOWNS. —— FINE WOOLED SHEEP. —— XIV. AMERICAN MERINOS. —— THE FLEECE.——THE HEAD.——THE BODY.——THE MOST PROFITABLE SHEEP.—— DIVISIONS OF WOOL.

Cosmopolitan Nature of Sheep.

Where sheep originated is a question difficult to answer. They are the first of the animals domesticated by man, and reasonably so, since they supply the two principal wants of the barbarian, food and clothing. They are found in every inhabited country, not entirely savage, from the Arctic to the Torrid zone.

To show the great diversity in character of sheep, it is only necessary to quote the classification of Linnæus, which is: The Hornless, Horned, Black-faced, Spanish, Many-horned, African, Guinea, Broad-tailed, Fat-rumped, Bucharian, Long-tailed, Cap-bearded, and Bovant. To these may be added the Siberian sheep of Asia, found also in Corsica and

Barbary and the Cretan sheep of the Grecian Islands, Hungary, and some portions of Austria, and we have about all the principal species.

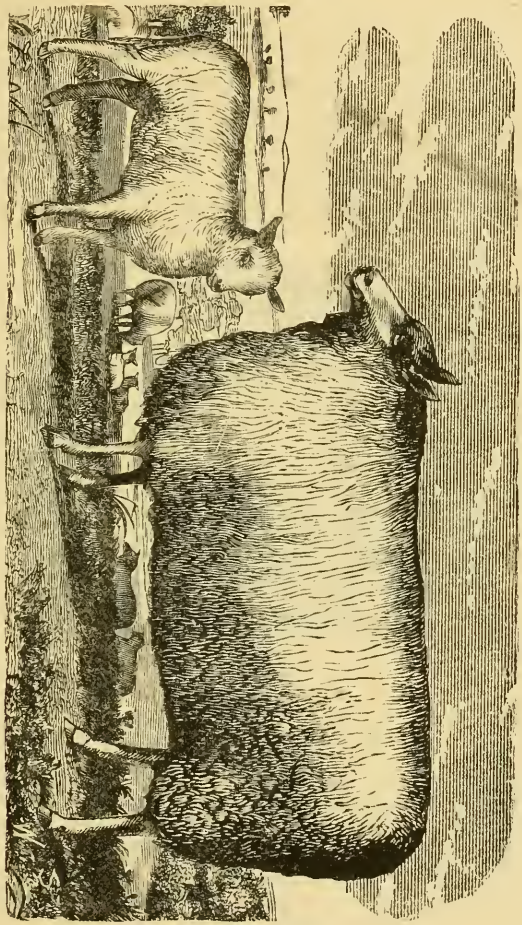


POINTS OF SHEEP.

Explanation—*A*—Face. *B*—Muzzle. *C*—Neck. *D*—Shoulder. *E*—Point of the Shoulder. *F*—Breast. *G*—Girth-place. *H*—Back. *I*—Loin. *K*—Rump. *L*—Thigh. *M*—Hip. *N*—Root of tail.

Notwithstanding the fact that sheep are among the principal sources of wealth of all peoples, it is only among enlightened nations that they have reached their highest development; and among these, Spain, France, Germany, Great Britain and her colonies, and the United States may be mentioned as those where systematic breeding have produced the most practical results. In no country has this been attained in the production of fine wool, to a more excellent degree than among what are now known as American merinoes, the result of scientific breeding of the Spanish sheep. From present appearances, it will be but a few years before we shall excel in the production of long-wooled, and mutton sheep. The United States has of course, no native sheep, if we except the *Ovis Montana*, which really is a sheep and not a goat (*Capra*) as many persons suppose. It inhabits the highest ranges of the Rocky Mountains from well north down to New Mexico. The hair, for it is not wool, although it is crimped, resembles the hair of the elk—is coarse, but soft to the touch, and slightly crimped throughout its length; about two inches long on its back, and on the sides one and a half inches. We believe they have never been bred in confinement. In passing it may be interesting to our readers to know that at the Paris Exhibition of 1865 there were exhibited the wild sheep of Barbary, *Ovis Tragelapus*, more resembling

a goat than our wild species. There were also shown there the Punjaub wild sheep, *Ovis Cycloceras*, a native of Northern India, and the European mouflon, *Ovis Musimon*, belonging to Corsica and Sardinia, but



LEICESTER EWE AND LAMB.

both bred in confinement. As illustrating something of the characteristics of the wild sheep, as well as to illustrate points the cut we give on preceding page may serve as an example.

Long-wooled Sheep.

There are but a few kinds of long-wooled sheep that have held their own in the improvement of the race for the last 100 years, sufficiently to be widely disseminated in the United States. These are the Leicester, Cotswold, Lincoln and Romney Marsh. Of these, Leicester, as improved by Bakewell and succeeding breeders, has perhaps exercised a more potent effect in crossing than any other of the long-wooled varieties. They fatten very kindly, and the best wethers will weigh at twelve to fifteen months old from 20 to 25 pounds per quarter, and at two years old from 30 to 38 pounds per quarter. The fleeces are valuable as long combing wool, and will weigh from 7 to 8 pounds each.

LEICESTER RAM.

I. Leicesters.

This breed is pure white, tolerably hardy, without horns, the head small and clean, eyes bright, neck and shoulders square and deep, the back straight, carcass full, hind-quarters tapering to the tail, legs clean, with fine bone, flesh succulent in quality, not the best, being much too fat for American palates; nevertheless, the grades make good meat with the single exception of possessing too much outside fat. Leicesters require the best of care and shelter, and of course good feeding. The ewes are not the best of mothers, and the young lambs require special attention. The wool is among the most valuable of any, being in especial

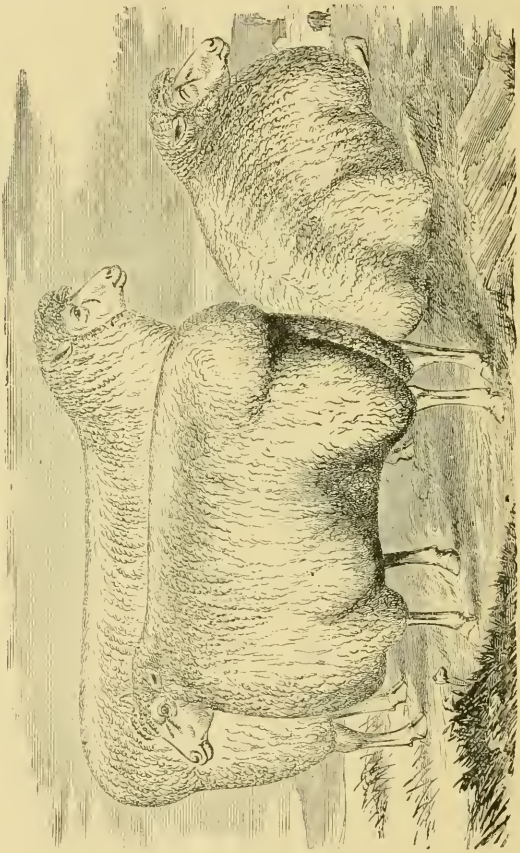
request for combing, and will average seven pounds per head in good flocks.

The Leicesters are well thought of in many parts of the West, and are increasing in popularity. The true type of the breed is as follows: The head should be hornless, long, small, tapering toward the muzzle, and projecting horizontally forward. The eyes prominent, but with a quiet expression. The ears thin, rather long, and directed backward. The neck full and broad at its base, where it proceeds from the chest, so that there is, with the slightest possible elevation, one continued horizontal line from the rump to the poll. The breast broad and round, and no uneven or angular formation where the shoulders join either the neck or the back; particularly no rising of the withers, or hollow behind the situation of these bones. The arm fleshy through its whole extent, and even down to the knee. The bones of the leg small, standing wide apart; no looseness of skin about them, and comparatively bare of wool. The chest and barrel at once deep and round, the ribs forming a considerable arch from the spine, so as in some cases, and especially when the animal is in good condition, to make the apparent width of the chest even greater than the depth. The barrel ribbed well home; no irregularity of line on the back or belly, but on the sides: the carcass very gradually diminishing in width toward the rump. The quarters long and full, and, as with the fore-legs, the muscles extending down to the hock; the thighs also wide and full. The legs of a moderate length: the skin also moderately thin, but soft and elastic, and covered with a good quantity of white wool.

II. Border Leicester.

The infusion of the blood, of the Dishley, or new Leicester as they were called, but which are now classified simply as Leicester sheep, upon the border flocks of England, gave rise to a sub-family, known as Border Leicester, and which have won a distinct position in English show yards. Their good and bad characteristics are as follows: The most marked feature in their structure, is the smallness of their heads, and of their bones generally, as contrasted with the weight of carcass. They are clean in the jaws, with a full eye, thin ears, and placid countenance. Their backs are straight, broad and flat; the ribs arched, the belly carried very light, so that they present nearly as straight a line below as above; the chest wide, the skin very mellow, and covered with a beautiful fleece of long, soft wool, which weighs, on the average, from six to seven pounds. On good soils, and under careful treatment, the sheep are usually brought to weigh from eighteen to twenty pounds a quarter at fourteen months

old, at which age they are now generally slaughtered. At this age their flesh is tender and juicy, but when carried on until they are older and heavier, fat accumulates so unduly in proportion to the lean meat as to detract from its palatableness and market value. This fat accumulation on mature animals is pretty constant in all the large and improved breeds.



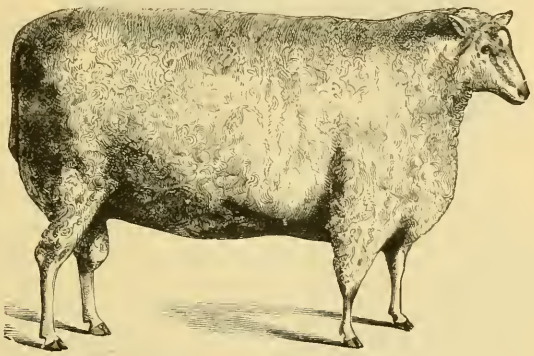
GROUP OF COTSWOLD EWES.

III. Cotswold Sheep

The Cotswolds were imported into the United States about 1832, since which time they have been reinforced from time to time by successive

importations, and now stand in the West, in the front rank of long-wooled sheep.

This is one of the largest English breeds, though the improved race is smaller than the originals, on account of the influence of the Leicester element in its amelioration. As a breed, it is of great antiquity. It has gained in fleece and form, and comes to maturity earlier; is more prolific than the Leicester, and has greater strength of constitution; is often fattened at fourteen months, yielding fifteen to twenty pounds of mutton per quarter, and twenty to thirty, if kept till two years old. They have a large head, but well set on, a broad chest, a well-rounded barrel, and a straight back. They are often used for crossing upon other breeds, and for obtaining earlier market-lambs, both in this country and in Europe. They are more widely disseminated in this country than any other long-wooled breed, and preserve well the popularity which they have attained here. Some imported sheep of this breed have borne fleeces in this country of eighteen pounds. A great weight when we remember that the wool shrinks comparatively little in washing.



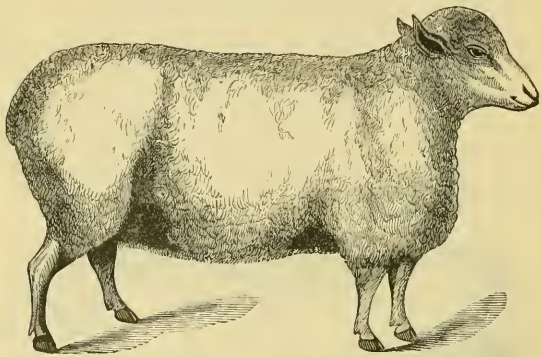
SHEARED COTSWOLD RAM.

The Cotswolds have been extensively crossed with Leicester sheep in England, by which their size has been somewhat diminished, but their carcass notably improved, and in addition, earlier maturity has been attained. The wool is strong, mellow and of good color, though rather coarse, 6 to 8 inches in length, and from 7 to 8 pounds per fleece.

Good Qualities of Cotswolds.

The superior hardihood of the improved Cotswold over the Leicester,

and their adaptation to common treatment, together with the prolific nature of the ewes, and their abundance of milk, have rendered them in many places rivals of the new Leicester, and has obtained for them of late years, more attention to their selection and general treatment, under which management still further improvement appears very probable. The quality of the mutton is superior to that of the Leicester, the tallow being less abundant, with a larger development of muscle or flesh. The ewes are prolific, and good mothers and nurses.



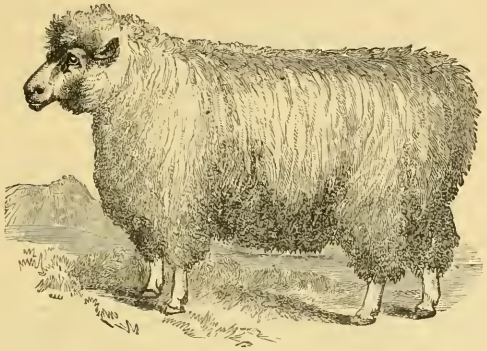
SHEARED COTSWOLD EWE.

Cotswolds in the West.

Throughout the entire West, the Cotswold has become a most favorite breed, and this not only on account of their long, handsome fleeces, specially adapted to the purpose of combing wool, but from the kindliness with which they take to our keep and climate. For this reason we have given this breed special prominence in our illustrations. It is not our province to go into long dissertations or detailed description, it would take too much space, and be productive of no good end. The illustrations we give will furnish a better index of value and characteristics. The cut on next page will show the appearance at one year old.

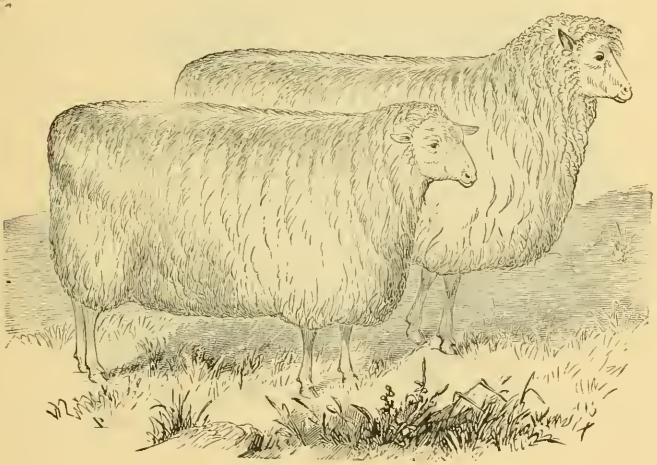
In relation to the adaptability of this breed South, a prominent Clark county, Virginia, farmer says: It is far more profitable to keep the different varieties of mutton breeds, than the fine wools, or Merino breed in this portion of Virginia. I say this from my own experience, and that of many intelligent gentlemen with whom I have conversed. The Cotswold sheep, and its crosses, with the Southdown are less liable to diseases

of all kinds; they are more prolific, better nurses, and less liable to lose their lambs than the Merino. The lambs are more vigorous and hardy;



YEARLING COTSWOLD.

then add their early maturity, their fitness for market at 18 months old, and their almost double value when in market, and you have advantages



COTSWOLD EWES.

which far outweigh the additional amount of food which the mutton sheep may consume in proportion to his size. There is one thing in con-

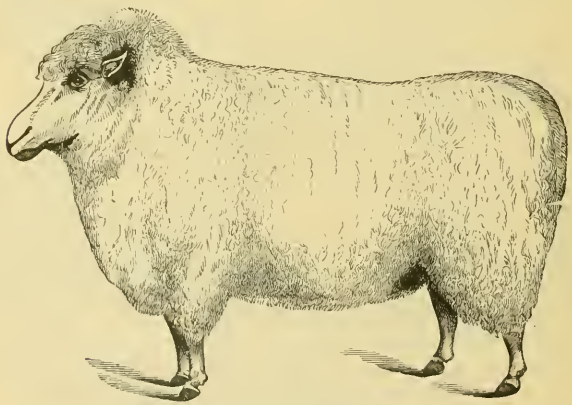
nection with all the long-wooled and large breeds of sheep that may be appropriately mentioned here: they cannot be kept in large flocks, like the smaller and fine-wooled breeds. Merinoes are often kept in flocks of 1,000 or more in the far West. The long-wooled, the middle-wools and the mutton breeds are especially adapted for farmers, when both mutton and wool are the considerations, and are seldom herded together in fields exceeding one hundred.

Thus in all the better settled portions of the West and South, where pasture and grain are abundant, and where the nearness to market affords sale for the mutton, the long wools are increasing in numbers from year to year, and with profit to the breeders and feeders, as well as in the just appreciation of those who consume the flesh.

IV. Lincoln Sheep.

The Lincoln sheep are both larger and heavier than either the Leicester or Cotswold, and are bred to a limited extent in the United States. The first importation was made in 1835. They are hardy, large feeders, prolific, yield fleeces of from 6 to 10 pounds each, and the carcasses have been known to dress 125 pounds.

V. New Oxfordshire Sheep.



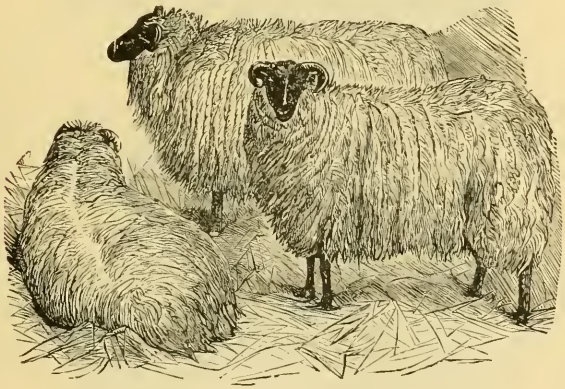
NEW OXFORDSHIRE EWE.

This breed should not be confounded with the Oxford Downs, a cross breed between Cotswold and Hampshire Downs, and which have dark faces. They are less hardy than the Cotswolds, and have not made much

progress in the United States. They are the result of a cross between the New Leicester and Cotswold, the latter blood being in excess. However they may be regarded in England, and they are regarded highly, they have not become popular in the West, as against the Cotswold. On the preceding page, we give a cut of a New Oxfordshire ewe, to close the subject of improved long wools in the United States as embracing the more prominent breeds.

VI. Middle-Wooled Sheep.

The Black-faced Scotch Highland sheep are small, active and docile when we consider that they are a purely mountain race. They stand great hardship, and work kindly in large flocks, subsisting on scanty fare when necessary. Hence they may be valuable in cold and mountain regions of the United States, for crossing on other breeds. They have open hairy fleeces, and black faces, weigh to average 65 pounds, and will shear about 3 pounds of clean wool. Their mutton is of most excellent quality, and crossed on larger breeds their fleeces will go to 6 or 8 pounds and their live weight to 128 pounds for wethers.



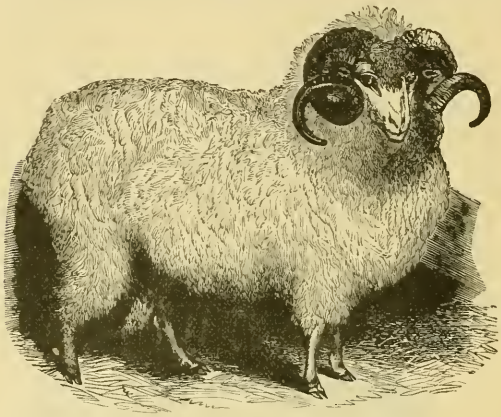
BLACK-FACED HIGHLAND SHEEP.

VII. Cheviot Sheep.

This is another mountain breed that has been introduced, to a small extent in the United States. Their fleeces however, are too coarse for carding wool. They are less hardy than the black-faced highlands, but

are quiet and docile, easily managed, giving fleeces averaging about 3 1-2 pounds, furnishing good mutton, weighing 12 to 18 pounds per quarter, at three years old.

VIII. White-faced Highland Sheep.



HIGHLAND SHEEP.

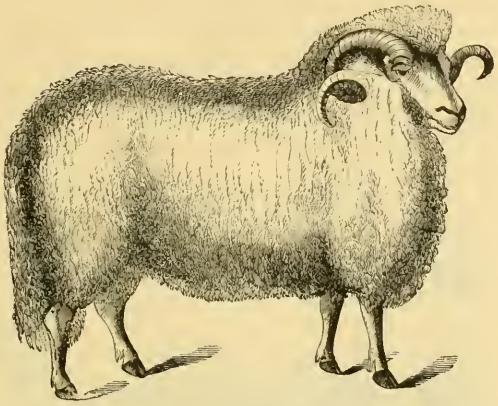
This is a sheep of great hardiness, furnishing good mutton, but not a wool of much value, and is introduced only as necessary to illustrate a breed adapted to sterile regions, where better breeds would not survive.

IX. Dorset Sheep.

Dorsetshire has a breed peculiar to itself. Strong, active, and well able to take care of itself: heavier in every respect than the highlands, and like this breed, a strong horned race. On this account, neither of these breeds would be considered valuable, except in regions where the better fleeced breeds would not live. The cut is given like that of the highland long horned family, as affording possible value in Alpine regions. Fortunately there is but little country of this nature in the West.

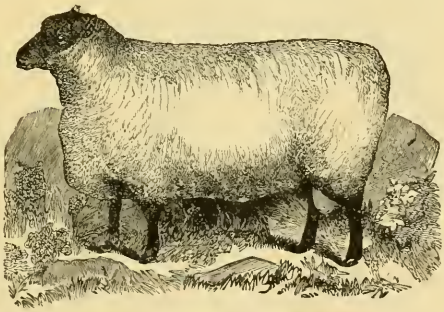
Short-wooled English Breeds.

Of the mutton breeds, the Downs undoubtedly stand at the head in



DORSET RAM.

both England and America. They are all compact, hardy, docile, hornless, and of early maturity in feeding; and with flesh of most excellent quality, that always commands the best price in any market.



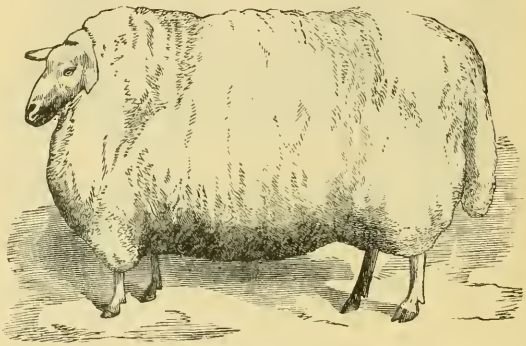
SOUTHDOWN RAM.

X. Southdowns.

These are without doubt the most superior, taken as a whole, of any of the mutton breeds, and have for many years been bred with the greatest

care in both England and America. Their faces and legs are dark brown, the fore quarters wide and deep, the back and loin broad, with round bodies, and square and full hind quarters.

The ewes are prolific, producing from 120 to 140 lambs, to the flock of 100 ewes. The staple of the wool is fine and curled, with spiral ends well adapted to carding, and will shear on yearling rams and wethers, from 6 to 9 pounds. In the neighborhood of large cities, where there is a demand for mutton, they are most valuable as a distinct breed, or for crossing with the common sheep of the country.



HAMPSHIRE DOWN.

XI. Hampshire Downs.

This breed had its rise in Hampshire, through an infusion of Southdown blood, followed later with Cotswold, and of course, since the Cotswold have an infusion of Leicester, they have this blood also. It has given them increased size, more wool, and at the same time they have preserved their great hardiness of constitution. For many years they have been bred pure, and so far as introduced into the United States, they have given satisfaction, especially in the South, where, before the war, they were in good repute. Those who have used them, claim that they are more hardy than Southdowns. It is also claimed that they have been crossed upon Cotswold and Leicester grades, with benefit to both, and this we do not doubt, where mutton was to be the object.

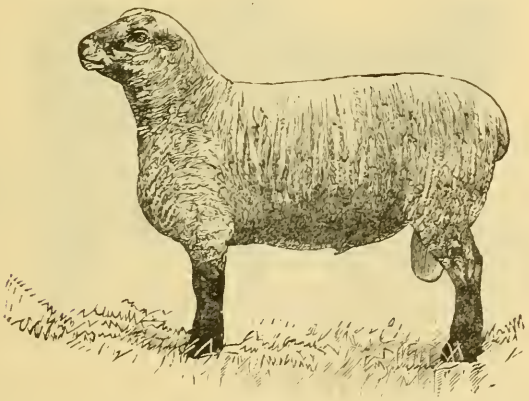
XII. Shropshire Downs.

Of late years this breed has grown into repute in the West, and in Canada. They are heavy sheep, nearly as large as the Cotswold, yield

nearly as much wool, with thick compact fleeces, are hardy and healthy, have even, compact, uniformly symmetrical bodies, with dark brown faces and limbs, and are about one third heavier than Southdowns.

XIII. Oxford Downs

This comparatively new family, which has come into prominence in the United States within the last twenty years, was originally made by crossing the Hamphire or Southdown ewe with a Cotswold ram. The Hampshire-Cotswold origin is due to the original breeding of a Mr. Hitchman, in England. A few years later Messrs. Druce, father and son, used the Southdown-Cotswold cross. From these, by constant care in selection, a sub-family was produced, possessing great uniformity, hardiness and a large frame; they are easy fattening sheep, producing mutton of superior quality, with fleeces of 8 to 10 pounds for ewes and 12 to 13 pounds for rams, and in length from seven to eight inches; a wool of good luster, neither hairy nor harsh.



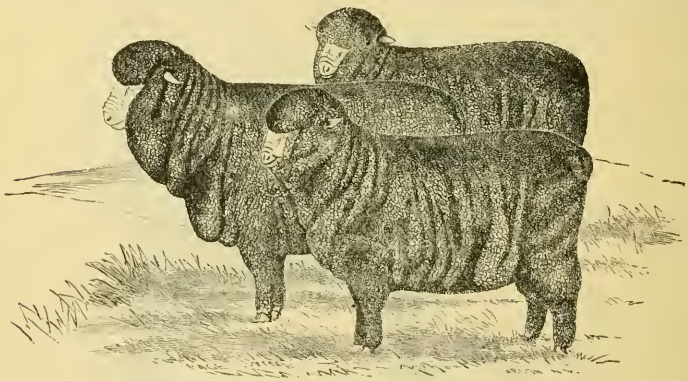
SHEARLING OXFORD DOWN.

In reality the only reason why these sheep should be called Downs, is, from their dark legs and faces. They really are not a short-wooled breed, in fact, as we have shown, they are a long-wooled race, and the characteristic has been carefully cultivated by breeders of this variety of sheep. In color, they are much lighter than the Southdown, their faces and legs being gray, instead of brown. The ewes are prolific, producing with good care, 150 lambs to the 100 ewes. They herd close together,

are not particular about their feed; they mature early, and upon hill pastures produce mutton of high quality.

XIV. Fine-Wooled Sheep.—American Merinos.

In treating of fine-wooled sheep, it will not be necessary to go into their history. It is enough to say that Spain and France have contributed from time to time their best specimens, which, under such management as that given by Mr. Jarvis,—selecting from five families of Spanish sheep, the Paulars predominating,—produced what was known as the mixed Leonese or Jarvis Merinos. In 1813 Mr. Atwood commenced the breeding of pure Merinos, from what was then known as the Humphrey stock. About 1844, Edwin Hammond, of Middlebury, Vermont, commenced breeding, taking for his stock selections from the Atwood family. To the judgment and skill of Mr. Atwood, and later followed by Mr. Hammond and other American breeders, we have seen produced what have been known distinctly as American Merinos: perfect in all that



GROUP OF AMERICAN MERINOS.

goes to constitute length and thickness of wool, evenness and fineness of staple, that looseness of skin which, while it lies in low, rounded, soft ridges over the body, offers no obstruction to the shears. These were the points sought, and for the last twenty years well met and sustained by the best breeders, East and West; so that we now have as thoroughly established, the descendants of the Infantado—large and of good length, and the descendants of the Paulars, a smaller breed, originally established in the United States by Mr. Silas Rich and his son, of Shoreham, Vermont. Thus making two well marked families, which it is altogether probable would be injured by the infusion of foreign blood, wherever it could be obtained.

The Fleece.

The fleece is the important point in Merinos: they are not mutton sheep, and their carcass is of secondary importance. Dr. Randall, nearly twenty years ago, in his work entitled "The Practical Shepherd," in writing of American Merinos, as they then were, says: "The greatest attainable combination of length and thickness of wool, of given quality, is the first to be regarded in a market where all lengths are in equal demand. And the more evenly this length and thickness extend over every covered part, unless below the knees and hocks, the higher the excellence of the animals."

It is in this point especially that the modern breeder has improved on his predecessors; and it is this, in a very considerable degree, which gives the improved American Merino its vast superiority in weight of fleece, over all other fine sheep, of the same size, in the world.

Wool of full length below the knees and hocks would hardly be desirable, on account of its liability to become filthy; but a thick shortish coat, particularly on the hind legs—making them appear as large "as a man's arm"—is regarded by many as a fine, showy point, though it does not add much to the value of the fleece.

The Head.

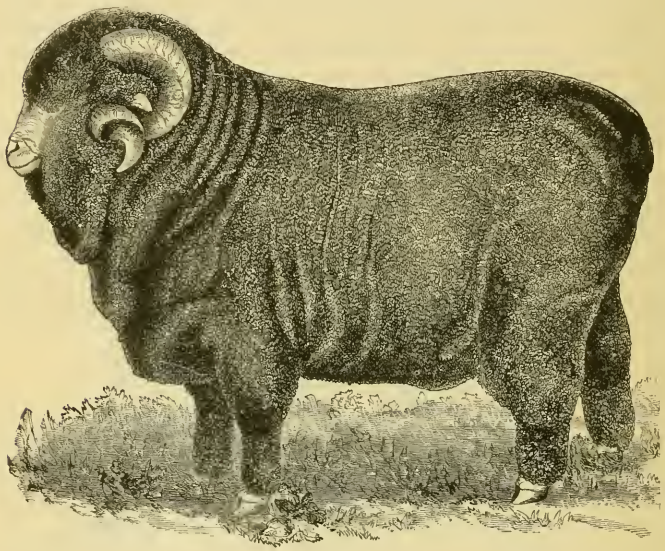
The wool should extend in an unbroken and undivided mass from the back of the neck over the top of the head and down the face for an inch or two below the eyes, and there abruptly terminate in a square or rounded shape; it should cover the lower side of the jaws nearly to the mouth, and rise on the cheeks so as to leave only the front face bare, terminating abruptly like the forehead wool. The cheek and forehead wool should meet unbroken, immediately over the eye, between it and the ear. But it must by no means *unite* under the eye—though its outside ends may touch there for a little way. The eye should have just naked space enough about it to leave the sight unimpeded, without any resort to the scissors.

The nose should be covered with short, soft, thick, perfectly white hair. Pale, tan-colored spots or "freckles" about the mouth, and the same color on the outer half of the ear are not objected to by the breeders of the Paulars—but Infantando breeders usually prefer pure white. Wool on the lower part of the face, as is often seen on the French Merinos, whether short or long, is regarded as decidedly objectionable, and any wool which obstructs the sight in any degree, is a fault.

Those who grow such fleeces now need not be ashamed to exhibit to-day in the best show rings of the country.

The Body.

The frame upon which the wool is to grow is important, for upon form and constitutional vigor depends the value of the animal. Below we give an illustration of a ram that would leave little to be desired, so far as ability to produce the best wool is concerned.



MERINO RAM.

Medium size, for the family, will hold in sheep as well as in other animals. An overgrown animal is not profitable in any breed. The body should be round, deep, of moderate length, the head and neck short and thick, back straight and broad, the legs short, straight, but well apart and strong, giving a deep full bosom and buttock. The forearm ample, and the junction of the thighs well down the hocks. The skin should be rather thin than thick; mellow, elastic, and loose on the carcass. If it be thick and rigid, it will be an evidence of a bad feeder, and consequently inferior wool.

The Most Profitable Sheep.

Of all the breeds of sheep ever introduced into the United States, the Merino has more than held its own in the estimation of breeders every-

where. Even in the neighborhood of our large cities, to-day, there are more grade Merinos sold for mutton, than of all the mutton breeds, distinctively. It is only near our great cities that the breeding and feeding of Cotswold, Leicester, and the Downs, could be made profitable, and this has mainly come about through the change in wearing apparel. Since the fashion came about among both ladies and gentlemen, of wearing garments of medium wool, a strong impetus has been given to the breeding of the Downs, and long wooled breeds. They are more tender and

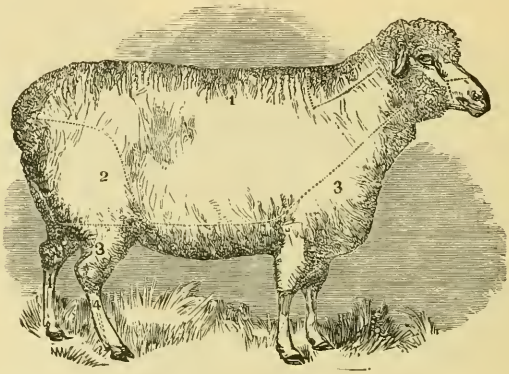
MERINO EWE.

delicate in their constitution, cannot stand extremes of cold and heat, as the Merinos; cannot shift for themselves as well, and for the reason that they cannot be kept in large flocks, are only suitable to small farms, in thickly settled districts, where good shelter and succulent food may be obtained. Thus the Merinos, and their grades and crosses will always be found the most profitable in all that great region West and Southwest, and in much of the country South, where the flocks to be profitable must number from one thousand to many thousands.

Division of Wools.

Most persons suppose that the wool of a sheep is uniform in quality. Such, however, is not the fact. As showing divisions and quality of wool, we give a cut of sheep with divisions accurately numbered, which shows points in the pure Merino and Saxon, and where the different qualities of

the wool are found. Some grades of sheep will often exhibit seven or eight qualities in the same fleece, whereas unalloyed breeds show but four qualities. The *refina*, or pick wool, (1) begins at the withers, and extends along the back, to the setting on of the tail. It reaches only a little way down on the quarters, but dipping down at the flanks, takes in all the superior part of the chest, and the middle of the side of the neck to the angle of the lower jaw. The *fina*, (2) a valuable wool, but



DIVISION OF WOOL.

not so deeply secreted, or possessing so many curves as the *refina*, occupies the belly, and the quarters and thighs, down to the stifle joint; (3) is found on the head, the throat, the lower part of the neck, and the shoulders, terminating at the elbow, fore legs, and reaching from the stifle to a little below the hock; (4) is procured from the tuft that grows on the forehead and cheeks, from the tail, and from the legs below the hock.

CHAPTER II

BREEDING AND MANAGEMENT OF SHEEP.

WATCHFULNESS NECESSARY. —— HOW TO BREED. —— TIME FOR BREEDING. —— COUPLING. —— KEEPING THE RECORD —— THE MANAGEMENT OF RAMS. —— TRAINING RAMS. ——PASTURING SHEEP. —— SHADE IN PASTURES.——WATER. —— DOSING SHEEP. —— FALL PASTURAGE AND FEEDING. —— SHEEP BARNS. ——SPECIAL WINTER FOOD. ——MANAGEMENT OF LAMBS.——DOCKING LAMBS. ——CASTRATION. —— WEANING.——THE NURSERY.

Watchfulness Necessary.

The fecundity of sheep soon enables the breeder to gather a flock. To keep them healthy is one of the most difficult problems of the breeder, since they are generally kept in large flocks, and herding closely together as they do, if an epidemic or contagious disease gets among them, it surely goes through the whole flock unless the shepherd is ever vigilant. The lack of care and vigilance causes more than half the losses in sheep, and hence, no person should undertake sheep breeding unless he make up his mind that they are to have not only gentle treatment but daily care and watchfulness, even in the Summer.

How to Breed.

The ewe may be bred to the buck at the age of eighteen months, and the buck will be fit for service at the same age. If the object be to breed grades, it will be found to be money squandered to buy an inferior buck,

whatever his blood may be. So, if to save a few dollars, the breeder select a grade buck for breeding purposes, the money is as good as thrown away. One buck if properly kept will serve one hundred ewes, so that the cost per lamb is really light. Thus in breeding grades, pursue the same course as advised for cattle. Select a good staunch ram, of well known purity of blood, avoiding the excessively high priced animals that are simply the best breeders of pure bloods. Such an one may be bred to the common stock of the country, and to his own progeny, to the third generation. As a rule the sire will give the leading characteristics of form, size, length and density of fleece and its yolkiness, he will do this eminently in proportion to the purity of his blood. The fineness and principal characteristics will be probably controlled by the dam. Hence the importance of none but the best sires.

In crossing, the Merino may be bred upon the common ewes of the country, always with benefit to the fleece, and never at the expense of the carcass. So the Southdown will improve them in mutton and wool. The Cotswold and Leicester will give increased size, early maturity and length of staple. To breed Merinos on any of the long wooled varieties would be useless. It would detract from the valuable qualities of the wool of either, reduce the value of the mutton, the size, propensity to fatten, and prolific qualities of the long wool. In the West the sheep for money are either pure Merinos, or pure Merino rams bred unto the common sheep of the country, with the exception before stated, where farms are small and near markets where prime mutton is in demand.

Time for Breeding.

The average period of gestation in the sheep does not vary much from one hundred and fifty-two days. They usually carry a male longer than a female, the period of gestation varying a week and sometimes two weeks. Therefore the shepherd can easily calculate when to have his ewes served by knowing when he wants his lambs in the Spring. This as a rule should be at the time of new grass in the Spring. Allowing that this occurs the first of April the ewes should begin to be served about the middle of September, and the season will then probably continue to the middle of October. If lambs for slaughter be the object then the ewes should be served fully a month earlier than usual, and extra shelter, warmed with fire heat provided for lambing time. This always pays. It is the early lambs that command the high prices in the important markets of the country.

Coupling.

We do not advise the use of teasers—that is, common rams aproned to show the rutting ewes. The better way is to drive the flock up to the yard twice a day and let the ram out with the flock. Immediately he has served a ewe catch and separate her from the flock. Keep all served ewes together, and under no consideration allow but one service. If they come again in heat it will be from the fourteenth to the seventeenth day. Thus they may be again returned to the ram after the thirteenth day, and if not in heat it may be set down that they have been properly served.

Keeping the Record.

In breeding grades it is only necessary to keep a correct record of the time of coupling, to correspond to the mark on the ewe. Where pure sheep are bred it will also be necessary to keep a record of the ram used. In the first case it is necessary to know when each ewe will drop her lamb. In the case of pure bred sheep it is imperative that a full and accurate record be kept, else confusion will ensue and the breeder will have lost all that was gained before him, and no breeder of pure sheep will buy from his flock. In order to bring the ewes into season at a specific time in seasons of drouth, or scant pasture, the ewes should have extra feed for three weeks before they are required to take the ram.

The Management of Rams.

The rams should never be allowed to run with the ewes at any season of the year. They are brutal always in their teasing, and if allowed so to run they not only exhaust themselves, but the ewes drop their lambs out of season. His separate enclosure should be dry and comfortable, and kept strictly clean, and be entirely away from the sight and hearing of the ewes, except when admitted to them. His feed must be the best of hay, or fresh grass, with what oats he will eat clean daily, beginning six weeks before the season with half a pound daily, and increasing the feed gradually to two pounds daily, if he will eat so much. Some flock masters sow oats and peas together, two bushels of the former to three pecks of the latter. This when threshed and ground together and fed, gradually increasing to a quart a day, makes most excellent feed for a hard-worked ram. On such feed, with pure water within reach at all times, a ram may be expected to properly serve one hundred to one

hundred and fifty ewes, and but few of them should come back the second time.

Never keep two rams in the same enclosure. They are essentially pugnacious, and very often a valuable ram is thus sacrificed, through the mistaken economy of the owner. In the beginning of the season, a ram should not be allowed to serve more than two or at most three ewes a day. This may be gradually increased to five, and again towards the close of the season, he may be again only allowed two or three. To do justice and retain full power of fecundation, he must have a good amount of exercise. To insure this, if inclined to be inactive, he should be driven about the yard for an hour every day. As a last word of caution we add: Keep the rams away from the ewes in Winter. They often seriously injure them, and by their teasing are a cause of abortion, to say nothing of other serious injuries they may inflict.

Training Rams.

It is quite necessary that rams should be made to understand that any vice will be severely punished. They should be early trained to stand quietly when tied, to lead at the end of the halter. They should never be tied with a rope about the roots of the horns. It is apt to gall, and make lodgment for maggots. Fasten polled sheep by a strap about the neck, and horned breeds in the same manner while they are young. When their horns are large enough, drill a hole through the left horn, near the tip and put in a bolt with eye and two inch ring, the whole fastened with a nut. Never tease, or allow a ram to be teased. It is sure to make them vicious. Handle kindly and gently, yet with a firm hand. If inclined to be vicious, punish them severely and until they are thoroughly cowed. A vicious old ram is dangerous at all times. Sometimes they become incorrigible; when this is the case geld them at once.

Pasturing Sheep.

The flock should go in the pasture as early in Summer as possible, but should be housed nights, and during cold storms. They should be regularly salted, at least every other day, and when salted should be counted and examined for any ailment that may occur. The best shepherds count every day, and salt every day, graduating the doses so the sheep will eat it entirely clean; and once or twice a week, giving a larger quantity.

Sheep are eager for shade in warm weather. We do not believe in shading pastures with trees. It is better and cheaper to have sheds, open on all sides, and of ample size to shelter the flock. The covering may be of boughs, or anything that is cheap. We have used common factory muslin, stretched on a light frame, double pitched roof, with a two foot space at the peak, for the escape of wind; the shed twelve feet wide and running north and south. This gives free ventilation, and is the coolest shade we know.

Water.

Water is not generally considered an absolute necessity to sheep when on pasture. Where they are allowed to graze when the dew is on the grass, or the grass is succulent, they seem to get along pretty well. We like them, however, to have a chance at water once a day. In the case of ewes suckling lambs it is necessary that they have water in plenty. Absolute purity of water however is always indispensable. Sheep object to drinking foul water, and their instinct ought to satisfy any person that it is not fit for them. Many serious disorders to stock of all kinds are occasioned by drinking impure water.

Dosing Sheep.

Wet, low, or mucky pastures are not fit for sheep. It is an entirely true adage that the sheep's foot must be kept dry; nevertheless there are many sheep kept other than among firm, dry, hill pastures. Some shepherds are continually dosing with salt and alum, salt and sulphur, and various other compounds under the supposition that it tends to health. Give them what salt they need, always, and examine them often for disease. When they are well, however, let well enough alone.

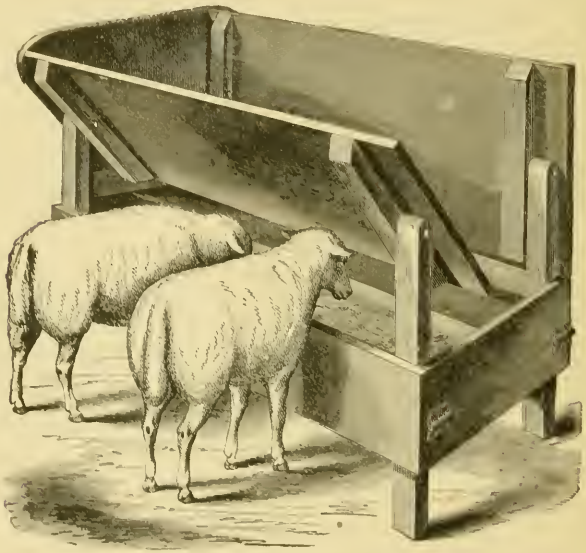
Fall Pasturage and Feeding.

In the Autumn, as the season advances, sheep should have some fodder. It is the time of year when, if allowed to fall in flesh a mischief is done that cannot be remedied. There is a peculiarity about wool that one shepherd in twenty knows nothing about. To have a uniform growth, and of equal strength, the wool must grow steadily, as the season advances. If the sheep are allowed to fall suddenly away, the growth of wool ceases. When growth again commences, the wool, instead of continuing even in texture will have what is termed a joint. This is often so weak that very slight force will break it. The microscope will reveal every period of starvation and subsequent good feeding that sheep may have experienced in the course of the year's growth of wool.

Thus the shepherd who would do well for himself must do well for his flock. He must not only feed and water well, and attend to the general health of the sheep, but he must house well.

Sheep Barns.

These need not be expensive structures, but they must protect thoroughly against wind and drifting snow, and at the same time be well ventilated. The barn is to be entirely enclosed with doors and windows, which, if made to slide, will serve for ventilation. Along the peak



CONVENIENT FEEDING TROUGH FOR SHEEP.

should be slatted chimneys of wood to assist ventilation. The stable should be divided into suitable pens to contain from twenty to fifty sheep each, according to the size of the flock, with doors from one to the other, racks for feeding hay, and troughs for grain, and for water also, if the sheep are to be wintered in the barn. There should also be suitable passage ways for feeding, etc. The arrangement of these racks, troughs and other conveniences, will readily suggest themselves, by referring to the plan for feeding cattle in barns. There is to be no tying up, of

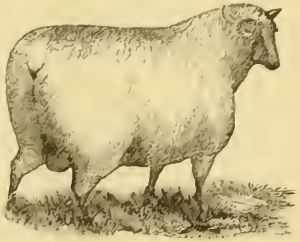
course, but the same general arrangement may be followed, and when the basement of a barn is to be used, the hay, grain, etc., may be handled in the same manner as there given. There is one thing, however, indispensable: As an attachment to every sheep barn, each pen should have a yard in which the sheep may be turned out in pleasant weather, for air and exercise. They may also be fed here in pleasant weather.

The annexed cut will show a good and substantial rack for outside feeding.

Special Winter Food.

While it is the fact that sheep may be fairly wintered on hay, it is not the most economical food in all the regions of the West and South, where corn and cereal grains are cheaply raised. Many shepherds object to corn as being too heating. We have never found any difficulty when it was fed with hay, and with a small feed of roots daily. It seems almost necessary to the health of sheep, that they have succulent food. In all the West, turnips are out of the question. Our hot Summers, and dry Autumns are not suited to this crop. Swedish turnips do better, since they may be sown late in May, or early in June and get root, so they

ALLOWED TO SHIFT FOR ITSELF.



WINTERED WITH GOOD SHELTER AND FEED.

will stand and produce good crops late in Autumn. They are also easily saved by keeping them nearly down to the freezing point in the winter pits. Sugar beets or mangel wurzel may also be raised at a cost—placed in the pits or cellar—that need not exceed two dollars a ton. Carrots and parsnips may be raised at a cost not exceeding three dollars per ton. With carrots, beets and parsnips so that each sheep may have even half a pound weight of root food once a day, they may be kept in admirable health, corn and hay being the only other food. Not only this, but we have wintered lambs in this way, and had them come out Spring after Spring, in the most admirable condition. Kept in this manner, they will

look like the young buck, shown at the right hand side of the page Allowed to shift for themselves as best they may, they will resemble the sheep shown on the left side of the page. Which would you choose?

There is one thing that should be observed in feeding roots. Carrots may be fed at all times. In feeding other roots, feed the Swedish turnips first, and after they are gone, the beets. Beets fed early in the Winter I have not found profitable. They have an acrid quality, that after the new year seems to be lost. Parsnips may be kept in the ground until Spring, and will be found, in connection with grain, most excellent for ewes, after lambing. Until lambing time we prefer to feed carrots, and corn, with enough bran mixed to keep the bowels fairly open. Thus fed, the fleeces will be heavy and even in texture. The sheep will not shed their wool when put on to grass, and the shepherd, if he has attended to the general health of the flock, will find that sheep really pay twice; once in the fleece, and once in the carcass.

Management of Lambs.

It is absolutely necessary, when early lambs are expected, that a warm place be provided for the ewe at lambing time. The room need not be large, and may be divided into pens suitable for each ewe when there are a number to lamb at one time. Heat the room by means of a stove, and if the ewes are healthy and hearty they will take care of themselves as a rule. But the shepherd should be present in case the young lambs want assistance, and here will be found the advantage in having made the sheep perfectly familiar with and relying on the keeper, for thus there will be no fear displayed. If the lamb appear weak and disinclined to suck, handle it carefully and hold it to the dam. A young lamb is at first the weakest and most foolish animal imaginable. Once it has got on its feet and sucked it is all right.

Docking Lambs.

This should be performed as soon as the lamb is fairly strong and growing; say when a week old. Let an attendant pick up thelamb, and holding his rump pretty firm against a post of suitable height, the shepherd seizes the tail, and pressing the skin back toward the body, places a two inch chisel at the point of separation, holding it firmly enough so that it will not slip, when with a light blow of a mallet it is severed. Throw the tails of rams in one pile and those of ewes in another, and enter in the shepherd's book the sexes and numbers. It is well at the same time to place a paint mark on the rump for future recognition. A pinch of

powdered copperas on the end of the tail will stop bleeding. Occasionally a lamb will bleed severely. If so, tie a ligature tightly around the stump, to be removed in about ten hours, or a touch of red hot iron will be more effective.

Castration.

Many perform this operation immediately before docking. It has always been practiced by myself and I have never found any reason to discontinue the plan. In any event the sooner it is done the better for the lamb. I have docked and gelded at three days old, and with the best success. An attendant holds the lamb, rump down, and with the back pressed against his own body; drawing the hind legs up, the body is pressed strong enough to cause the belly to be forced between the thighs, and the scrotum is thus well exposed. Seizing the scrotum the operator cuts away one-third of it; take each testicle in turn and sliding back and off the enveloping membrane, with a quick jerk the whole cord and connecting tissues snap and come away. The object in cutting away a part of the scrotum is that it makes a better surface in shearing. This pulling away of the cord may seem cruel. It is not so; there is almost no bleeding, and the violence of the rupture deadens the pain. It is sometimes necessary to geld an old ram. The best way is to tie a waxed linen cord as tightly as possible about the bag, being careful that it is tied entirely above the testicles, and that there shall be no possibility of slipping of the knot. Thus circulation is stopped and in a few days the strangulated part will drop away; or the operation may be performed precisely as in the case of the horse. We have however never used any other means either with bulls or rams than that indicated above, and with success.

Weaning.

Spring lambs should be weaned early enough in the Fall so they may become fully accustomed to grass and to grain before Winter sets in. If a corn-field has at the last cultivating been sown with rye, it will afford nice feed for lambs in the Fall, and in the following Spring it will be found most valuable for breeding ewes. If there is stubble ground, in which green oats or wheat have started, it makes excellent pasture for lambs, since they will also pick up some grain. In any event, they should be learned to eat grain by having their salt sprinkled on grain in a trough under cover, so they may learn to eat it. So far as Winter management is concerned, the same rule will apply as to other animals. Give them

the best of the hay and a liberal quantity of grain, to keep them growing right along.

The Nursery.

In all large flocks there will always be some lambs that do not do well. These should always be separated from the others and have extra care. So in the older sheep—the flock should be graded as to age, size and sex. It is better that the wethers and the ewes be kept apart, and that in the sexes that very strong animals be not put with weak ones. If they do no other mischief, they rob the weak ones of their food, the very thing they most need. In fact, every farm should have a nursery, however small the flock, where weak ones and wethers may receive special attention and care. Sheep upon farms suited to them are very profitable, but however suitable the farm, the profits will be in direct proportion to the intelligent care and attention the animals receive.

PART VI.

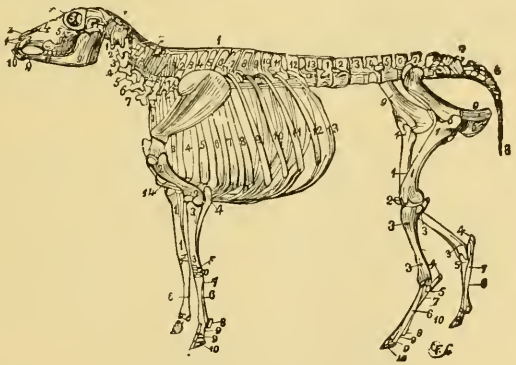
DISEASES OF SHEEP.

CAUSE, PREVENTION AND REMEDIES.

CHAPTER I.

ANATOMY AND DISEASES OF SHEEP.

THE HEAD.——THE TRUNK.——THE FORE-LEG.——THE HIND-LEG.——IMPORTANCE OF THE HEAD TO BREEDERS. —— DISEASES OF THE HEAD AND BRAIN. —— THE TEETH.—— SWELLED HEAD —— VEGETABLE POISONING. —— INFLAMMATION OF THE EYE.——SHEEP DISTEMPER.——HOW TO KNOW IT.——WHAT TO DO.——GRUBS IN THE HEAD. —— HOW TO SAVE THE SHEEP. ——APOPLEXY. ——PREVENTION. —— INFLAMMATION OF THE BRAIN. —— TETANUS, OR LOCK-JAW.——PALSY.——RABIES.—— HYDATIOS ON THE BRAIN. —— PARASITES OF THE BODY AND SKIN.——THE SCAB.——HOW TO KNOW IT. —— WHAT TO DO. —— DISEASES OF THE GENERATIVE AND URINARY ORGANS. —— DISEASES OF THE LIMBS AND HOOFS,——FOOT ROT. —— HOW TO CURE IT.——TOULS, AND TRAVEL-SORE FEET.——GRAVEL.——THE BIFLEX CANAL. —— MAGGOTY SHEEP. ——LUNG WORMS.——INTESTINAL WORMS.——ROTTEN LIVER.——COLIC.



SKELETON OF LEICESTER SHEEP.

The Head.

Explanation.—1—The intermaxillary bone. 2—The nasal bones. 3—The

upper jaw. 4—The union of the nasal and upper jaw bone. 5—The union of the molar and lachrymal bones. 6—The orbits of the eye. 7—The frontal bone. 9—The lower jaw. 10—The incisor teeth or nippers. 11—The molars or grinders.

The Trunk.

1, 1—The ligament of the neck, supporting the head. 1, 2, 3, 4, 5, 6, 7—The seven vertebræ, or bones of the neck. 1—13—The thirteen vertebræ, or bones of the back. 1—6—The six vertebræ of the loins. 7—The sacral bone. 8—The bones of the tail, varying in different breeds from twelve to twenty-one. 9—The haunch and pelvis. 1—8—The eight true ribs with their cartilages. 9—13—The five false ribs, or those that are not attached to the breast bone. 14—The breast bone.

The Fore-leg.

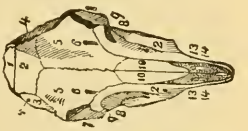
1—The scapula or shoulder-blade. 2—The humerus, bone of the arm, or lower part of the shoulder. 3—The radius, or bone of the forearm. 4—The ulna, or elbow. 5—The knee, with its different bones. 6—The metacarpal, or shank-bones; the larger bones of the leg. 7—A rudiment of the smaller metacarpal. 8—One of the sessamoid bones. 9—The two first bones of the foot; the pasterns. 10—The proper bones of the foot.

The Hind-leg

1—The thigh bone. 2—The stifle joint and its bone, the patella. 3—The tibia, or bone of the upper part of the leg. 4—The point of the hock. 5—The other bones of the hock. 6—The metatarsal bone, or bone of the hind-leg. 7—Rudiment of the small metatarsal. 8—A sessamoid bone. 9—The two first bones of the foot, the pasterns. 10—The proper bone of the foot.

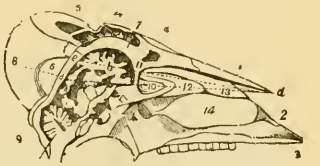
The bones of the loins bear a strong resemblance to those in the back, but instead of springing from the sides, as do the ribs, they are fixed, bony processes, several inches in length, and their peculiar duty is to afford protection to the abdomen. They are the timbers that support the roof, or covering of this part of the system. Next in position to the loin comes the sacrum, which is formed in young animals of separate bones, but at maturity is consolidated into one. At this point the passage for the spinal cord becomes very much diminished, and, at the end of the bone, terminatos in several nerves, which continue their course into the tail. The bones of the latter are numerous, but not perforated. We pass now to the limbs, and find that the number of joints are the same in the horse, ox, and sheep, but in the latter animals, at the fetlock, these become divided and the four bones beneath it are thus doubled.

The bone which forms the elbow-ulna does not support much of the weight of the animal, but serves to attach the powerful muscles, so noticable in bones, with good fore-arms. The attachment of the ulna to the radius forms a lever. The carpas or knee is composed of seven distinct bones, placed in two rows. The upper row articulates with the radius; the metacarpus.



SKULL OF A POLLED SHEEP.

Explanation—1—Occipital bone, depressed out of danger. 2—The parietal bones, the suture having disappeared, and also out of danger. 3—The squamous portions of the temporal bone—the buttress of the arch of the skull. 4—The meatus auditorius, or bony opening into the ear. 5—The frontal bones. 6—The openings through which blood-vessels pass, to supply the forehead. 7—The bony orbits of the eye. 8—The zygomatic or molar bones, very much developed. 9, 10—The bones of the nose. 11—The upper jaw bone. 12—The foramen, through which the nerve and blood-vessels pass, to supply the lower part of the face. 13—The nasal processes of the intermaxillary bones. 14—The palatine processes. 15—The intermaxillary bone, supporting the cartilaginous pad, instead of containing teeth.



HEAD OF SHEEP—VERTICAL SECTION.

Explanation—1—Nasall bone. 2—Upper jaw bone. 3—Intermaxillary bone supporting the pad, supplies the place of upper front teeth. 4, 4—The frontal sinus. 5—Cavity or sinus of the horn, communicating with the frontal sinus. It is here shown by removal of a section of the base of the horn. 7—The frontal bone. 8—Vertical section of the brain. 9—Vertical section of the cerebellum. *a*—The cineritious portion of the brain. *b*—The medullary portion of the brain. 10—The ethmoid bone. 11—The cribiform or perforated plate of the ethmoid bone. 12—The lower cell of the ethmoid bone. 13—The superior turbinated bone. 14—The inferior turbinated bone. 17—The sphenoid bone.

Importance of the Head to Breeders.

The head of the sheep is one of the important points by which to estimate the quality and profitableness of the animal. The frontal bone (1) projects both forward and laterally, and gives to the sheep a peculiar

appearance as regards breadth of forehead and prominence of the eye. This design of nature is intended for the base of the horns, though in breeds known as hornless, or polled, the same formation is observable. The room from eye to eye is occasioned by the frontal bones (5, 5, of polled sheep) reaching as far below the range of vision as above it, and very materially shortening the nasal (10, 10,) bones. These reach upward to the parietal bones (2) which latter constitute an important portion of the posterior, slanting portion of the skull, just below the junction of the frontal and parietal bones; the head falls off in fullness—a backward sloping, so to speak, and the part of the frontal bone most important because covering the brain, is removed from the danger resulting from concussion of the head in fighting. The form of the brain in the sheep, is similar to that of the horse and ox, but is longer in proportion to size, and broader in the back than in the front. The brain of the sheep so closely resembles, in its conformation and structure, that of a man, though smaller in proportion, that it furnishes the medical student with a good substitute for the human subject. The membrane covering the brain is technically called the *pia mater*. The *dura mater* lines the skull, and between the latter and the former is a delicate membrane called *ternica arachmides*. The nerves, of which ten pairs are connected with the brain, and thirty with the spinal cord, supply the sense of feeling, seeing, hearing, tasting, smelling, &c., and a portion conveying the volition of the brain to all parts of the body, are termed nerves of motion.

Diseases of the Head and Brain.

In Europe, and especially in Great Britain, sheep are subject to a long category of diseases. Fortunately, in this country sheep thus far have been subject to comparatively few diseases, and especially so in the West; owing probably to the fact that, except in the Spring, and sometimes for a short period in the Autumn, the climate and the soil are dry. Mr. Spooner, the able English veterinary writer, remarks upon the rarity of inflammatory diseases in American sheep. This he attributes to the muscular and vascular structure of the sheep, comparing the indifferently kept sheep of his day with highly fed British sheep. The real cause, however, of exemption from disease lies more in the climate than anything else. Another special reason probably is that our flock masters are, as a rule, men of intelligence, who trust but little to ignorant shepherds, as is not the case in Great Britain and on the continent. We shall therefore touch lightly upon many diseases specially treated of in foreign works, and pay more particular attention to that class of diseases most prevalent with us.

The Teeth.

The sheep has eight incisors in the lower jaw, and twelve grinders—six on a side in each jaw,—making in all thirty-two teeth. At birth the lamb should have the two central incisors just pushing through. At a month old all the incisors should be up. At one year, sometimes not until fifteen months old, the two first milk incisors will be shed, and two new or permanent ones will appear. At two years old past, it will have two more permanent teeth, or four in all. At three years old past it will have six permanent incisors, and at four years old past the eight permanent teeth, or a full mouth, as it is called, will be shown. This will be an accurate test as to the age of sheep, up to four years, varied of course by care and keep; highly fed sheep developing faster than illy kept ones. At six the incisors begin to decrease in breadth, and lose their fan shape, as seen at four years old. At seven they become longer and narrower, and each year this shrinkage continues, until at last they become quite slender, the middle ones long, and at ten years they loosen and begin to drop out. In the West few sheep are kept to the age of ten years, except in the case of valuable ewes and bucks. The principal care necessary with the teeth is, if decay is suspected, to examine, and extract the decayed ones, or pierce the nerve with a hot iron.

Swelled Head.

Sheep sometimes are bitten by venomous snakes, but this seldom occurs, and when so the animal is usually beyond help before being found. The bites of insects however, sometimes give trouble. When swelling from this cause is discovered, cut the wool from around the wound, wash with warm water, dry, rub thoroughly with lard oil, and if the insect may have been a venomous one, give the following dose each hour until relief is obtained:

No. 1. ¼ Scruple hartshorn,
1 Ounce rainwater.

Vegetable Poisoning.

The faces of the sheep sometimes become poisoned from feeding near noxious plants. Bathe the sore place with warm water, and then moisten with the following:

No. 2. 10 Grains acetate of lead,
1 Ounce water.
Dissolve.

This is also excellent for burns, bruises, irritable and moist ulcers, inflamed tendons, moist skin diseases, and cracked and itching surfaces, and also for sore lips.

Inflammation of the Eyes.

Simple ophthalmy sometimes occurs in sheep. If there is serious inflammation, bleed slightly from the facial vein—the vein running down obliquely from the eye, and bathe with the following:

No. 3.
3 Grains sulphate of zinc,
1 Ounce water,
15 Drops laudanum
Mix, and bathe lightly twice a day.

Sheep Distemper.

Malignant epizootic catarrh is an epidemic accompanied by severe congestion and inflammation of the lining membrane of the nasal cavities and sometimes extending into the stomach and bowels, is as to its cause unknown, but has occasionally been very fatal, both East and West.

How to Know It.

There is depression, a slight watery discharge from the nostrils and the eyes, which are partly closed and paler than natural. There is more or less loss of appetite. The pulse is normal as to frequency, but is weaker than usual. There is no cough, and the breathing is not changed unless the bronchial tubes are affected. The symptoms increase, until the end of a week the discharge from the nose is thick and glutinous, sometimes tinged with blood; eyes half closed, the lids gummed with a yellow secretion. The respiration is difficult, emaciation and prostration great; the pulse very low, the appetite is gone, and in from ten to fifteen days the animal dies.

What to Do.

At the first symptoms, remove the sheep to a dry, well ventilated place, where they may be kept comfortably warm. Give them concentrated and nourishing food and stimulants. If the bowels are costive, give them, say:

No. 4.
8 Grains corrosive sublimate,
1 Oz. rhubarb,
2 Oz. ginger,
2 Oz. gentian.

Simmer the last three in a quart of water for ten or fifteen minutes; strain, and add the first. Give two table-spoonfuls twice a day. In any case, avoid all strong purging or bleeding. An equable warmth, good feeding, nourishing drinks, and good nursing, is what will save, when possible, if taken early. If not well nursed the patient will be sure to die.

Grubs in the Head.

In July and August, if sheep are seen standing crowded together with the heads close to the ground, occasionally stamping violently, or striking with their fore feet, be sure the sheep gad-fly *Œstrus Ovis*, is attempting to deposit her eggs in the nostrils of the sheep. This fly is somewhat like the ox gad-fly, but smaller. The egg deposited, the maggot soon hatches, ascends the sinuses of the nose, causing much irritation. Then it grows during Winter, and in the Spring descends and falls on the ground, burrows therein, assumes the form of a chrysalis, to be again transformed into a perfect fly.

How to Save the Sheep.

Prevent the flies from laying their eggs. Plow a portion of the field into furrows of loose soil; keep the sheep's noses smeared with tar, by tarring once a day through the season of the fly. I have caught them in a light bag net, such as boys use in catching insects. A reward of five cents for every fly caught would well repay the sheep owner.

The maggots affix themselves by their strong hooks, and are not easily dislodged. Violent sneezing will sometimes dislodge them. Thus Scotch snuff may be blown up the nostrils. The infested sheep may be driven in a close place, and horn shavings or leather burned to irritate the membrane of the nostrils. A better way, when carefully done, is to secure the sheep, hold the head up, and pour into each nostril a teaspoonful of equal parts of sweet oil and turpentine, well shaken together. Be careful, however, that the sheep is not strangled by the mixture entering the lungs. The grubs are sometimes extracted by the surgeon. It is a nice operation, and as a rule will not pay its cost

Apoplexy.

This is a disease seldom seen in the United States, and confined to sheep of a plethoric habit, and is generally fatal if not taken early. The sheep leaps suddenly in the air, falls and dies in a few moments. The remedy is early and copious bleeding from the neck (jugular) vein, until

the sheep shows signs of weakness. A pint of blood is sometimes taken from full-bodied, large sheep and less for smaller ones.

Prevention.

This is better than cure. If a sheep be dull, and apparently unconscious of what is going on; if the membranes of the nose are deep red or violet, the nostrils and pupils of the eye dilated, the pulse hard, and the breathing stertorous, bleed immediately, and afterwards give two ounces of salt, to be followed by an ounce every six hours until a copious evacuation is produced.

Inflammation of the Brain.

This is a secondary effect of the causes which produce apoplexy. The animal is dull and inactive. The eyes are red and protruding, and at length the animal rushes about in the wildest delirium. The same remedy is prescribed as for apoplexy.

Lock-jaw.

This is produced from a variety of causes, among the more common, being inflammation of the membranes from improper gelding, injuring the hoofs, horns, etc. The animal is unable to walk, or only so with difficulty; the jaws are set, and death ensues in a short time. Warmth, quiet, and bleeding from the jugular vein, is recommended. We should omit the bleeding and give one-half to three-quarters of an ounce of castor oil, according to the age of the sheep, the disease being confined mostly to lambs, and sheep after gelding. Follow the dose of castor oil, in half an hour, with ten grains of opium, and at the end of an hour, give another ten grains of opium if a decided sedative effect is not produced. Epilepsy is a kindred disease, in fact tetanus is considered to be an aggravated state of epilepsy. The remedial means will be the same.

Palsy.

This is the opposite of epilepsy. The sheep is unable to move its limbs. It is supposed to be produced by cold and improper treatment. It is rare in this country. Take the lamb to a warm place, give it warm gruel, with a little ginger mixed in it. If a purgative is indicated give the following:

No. 5. 2 Oz. epsom salts,
½ Drachm ginger.

Mix in half pint of ale or water; to be followed by two drachms of laudanum in an hour.

Rabies.

Sheep are apt to be bitten by rabid dogs. The only preventive is to kill all strange dogs. The remedy is to kill the sheep as soon as attacked.

Hydatids on the Brain.

This is a disease of rare occurrence in America, probably from the fact that range is greater and dogs fewer to the square mile. The disease once fixed, nothing, practically, can be done, at least except a thorough veterinary surgeon be called, since it involves a delicate surgical operation. The bladder worm or hydatid is a form of the tape worm of the dog, in an earlier stage of existance. The mature tape worm lives in the bowels of the dog, its eggs are voided with the excrement, and in close pasturage the sheep take the eggs while grazing; hatching, they make their way to the brain, where they grow, and must remain until eaten by some other animal. Thus the dog eats the sheep's head, acquires the tape worm, and the insect again goes its round of life. Allow no sheep's heads to be eaten without thorough cooking, kill all strange dogs, and give your shepherd dogs a good vermifuge occasionally.

One of the plans adopted to get rid of the hydatid when it can be located is to pierce the cyst with the needle of a strong hypodermic syringe, and inject into it half a tea-spoonful of the following:

No. 6.
1 Grain iodine,
5 Grains iodide of potash,
1 Ounce water.
Mix.

Parasites of the Body and Skin.

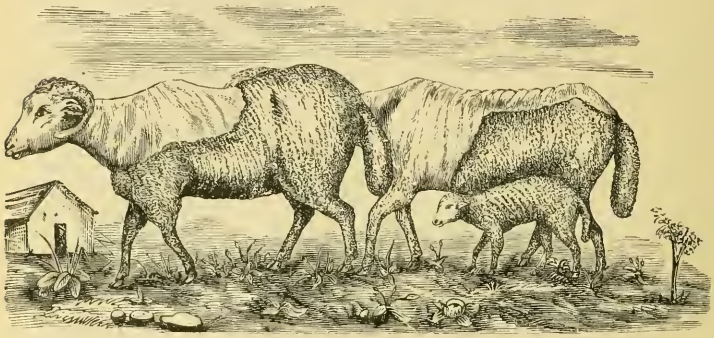
Sheep are infested with lice, three different forms of parasites which produce scab, also with ticks, intestinal worms, parasites of the liver, lungs, etc.

The Scab.

This is produced by a minute, almost microscopic insect, which burrows under the cuticle, producing intense irritation, the escape of serum, and which drying, brings off with it wool and all, and, spreading with great rapidity, soon infests the whole flock. The tenacity of life of these insects is so great that a scabby pasture has been said to spread the contagion after three years. The prevention of infection should be imperative with every flock master.

How to Know It.

The sheep is restless and constantly rubbing itself against posts and other objects it can get near. It bites itself with its teeth, and scratches itself with its hoofs. Soon the fleece becomes ragged and begins to fall out, and the animal appears wretched and unsightly, and at length dies.



A BAD CASE OF SCAB.

What to Do.

The remedies are both liquid and oily. A good dip, and one regarded in England as most effective, is the following:

No. 7.

3 Pounds arsenic,
3 Pounds pearl ash,
3 Pounds sulphur,
3 Pounds soft soap.

Mix in ten gallons of boiling water, stir, but avoid the fumes, and add ninety gallons of cold water. Prepare a tank that will easily allow a sheep to be dipped, having a slanted, slatted drain at the side, tight bottom underneath to allow the drip to run back. Dip the sheep, back down, being careful not to allow the head to enter the poisonous mixture, letting the animal remain one minute. Lift on to the slats and rub and squeeze the wool, until pretty well drained, and place in a yard until dry. When dry, go over the flock again, as to the heads, with the following:

No. 8.

1 Pound mercurial ointment,
6 Pounds lard,
1 Pound rosin,
½ Pint oil of turpentine.

Mix the mercurial ointment with the lard by heating gently and stirring. Dissolve the resin in the turpentine and rub all together when the lard is cold. Part the wool on the head between the ears, on the forehead, along the neck and under the jaws, and rub in the ointment.

In the United States, tobacco is often used in the place of arsenic; if used, substitute ten pounds of strong tobacco leaves for the arsenic in the formula as given above.

A formula in great repute among Australian shepherds, is the following:

No. 9.

1 Pound tobacco leaves,
1 Pound sulphur,
5 Gallons water.
Boil the tobacco in the water, then add the sulphur.

The sheep is dipped in this solution while quite hot, and retained in it four or five minutes, its head being from time to time thrust under so as not to enter the eyes, nose, or mouth, and the wool pressed and dried as before stated.

Diseases of the Generative and Urinary Organs.

Use the remedies prescribed for cattle, noting the doses as given for sheep in the list of medicines for animals.

Diseases of the Limbs and Hoofs—Foot Rot.

This is an infectious disease often aggravated by grit and dirt increasing the inflammation. The indications of rot are described minutely by Dr. Randall:

The first symptom is the disappearance of the naturally, smooth, dry, pale condition of the skin at the top of the cleft, over the heels. It becomes somewhat red, warm and moist, and slightly rough or chafed. Next, the moisture increases to a discharge, and an ulcer is formed which extends down to the upper portion of the inner wall of the hoof. These walls are then attacked, become disorganized, and the disease penetrates between the fleshy sole and the bottom of the hoof. The hoof is thickened at the heel by an unnatural deposition of horn. The crack between it and the fleshy sole pours out an offensive and purulent matter. Soon all parts of the foot are penetrated by the burrowing ulceration, the horny sole is disorganized, and the fleshy sole becomes a black and swollen mass of corruption, shapeless, spongy, and often filled with maggots. The fore-feet are usually first attacked; lameness is early noticed and soon

becomes complete; the appetite is lost, and the animal dies from exhaustion. The offensive odor of the true foot rot is characteristic, and once made familiar will serve as a certain guide in recognizing the disease. The disease may present itself in a malignant and rapid form, or in a mild one. The first attack on a flock is generally of the severe character. When it is kept under the first year, its appearance the next Summer will be mild; and the third season still milder.

How to Cure Rot.

Every part of the diseased structure must be cut away, cleaning the knife from time to time. This thoroughly accomplished, prepare a tank, which is to be filled to a depth of four inches, with a strong, saturated solution of sulphate of copper, blue vitriol; let each sheep stand in this, heated as hot as they can bear, for ten or more minutes, keeping the whole hot by occasionally plashing a piece of heated iron in it, or adding a quantity of the solution boiling hot. It is also well to cover the hoof with chloride of lime, and fill the cleft of the hoof with a piece of tow long enough so the ends can be twisted into a cord to be fastened around the fetlock. This makes a good bandage. The hoofs should be examined daily for sometime and the chloride renewed if necessary. Keep the sheep in a dry, well-littered yard, or on a dry, short pasture, and feed well. If the case is bad, the following tonic given internally will be necessary:

No. 10. 2 Drachms common salt,
½ Drachm sulphate of iron,
½ Drachm nitrate of potash.
Mix as a powder and give daily.

Fouls and Travel-sore.

These may be cured, the first by washing the cleft of the hoof with warm water and applying a strong solution of blue vitriol, and the latter by touching the thin places in the hoofs with a feather dipped in oil of vitriol, and smearing over with tar. Or better, prepare the following:

No. 11. 1 Part solution of chloride of antimony,
1 Part compound tincture of myrrh.

Gravel.

Sheep often become graveled. If lame in the least examine them, and cut the horn of the hoof to expose the gravel; extract it and cover the wound with tar.

The Biflex Canal.

The issue as it is called (biflex canal) in the front and upper part of the hoof, sometimes becomes irritated and swollen. Do not follow the advice of ignorant persons and "cut out the worm." If any thing is embedded therein, extract it. If simply swollen and inflamed, and perhaps ulcerated, lance it in two or three places slightly and dress with compound tincture of myrrh.

Maggoty Sheep.

Often in hot weather, from one cause or another, flies will lay their eggs, either in a wound, or, if the sheep is dirty, in the accumulated dung about the thighs. The prevention is cleanliness. Keep the sheep well tagged, that is shear the wool from under the sides of the tail, and diagonally thence some ways down the thighs. If maggots exist they must be taken out, and the wounds touched with

No. 12. 1 Part creosote,
4 Parts alcohol.

And afterwards bathed daily, until relieved, with tincture of myrrh.

Other Diseases.—Lung-Worms

This disease is caused by the presence of worms, the *strongulus filaria*, which sometimes make their way into the lungs, but are usually found in the windpipe and bronchial tubes and bowels of sheep. If there is dysentery, with fetid stools, examine the evacuations and the mucus of the mouth and throat for indications of the worms. If there is a husky cough and quickened breathing; if the sheep rubs its nose on the ground; if it lose its appetite and flesh prepare the following:

No. 13. 6 Oz. sulphate of magnesia,
4 Oz. nitrate of potash.

Pour on these three pints boiling water, and when the solution is milk warm add:

No. 14. 4 Oz. oil of turpentine,
½ Oz. bole armeniac.

Mix well and give two or three tablespoonfuls every other day.

When the worms are supposed to prevail, the following may be made into twelve doses, one to be given once in two weeks, as a preventive:

No. 15. 2 Oz. oil of turpentine,
2 Oz. powdered gentian,
2 Oz. laudanum.
Dissolve in a quart of lime water.

This is enough for twelve sheep.

Intestinal Worms.

The presence of intestinal worms and other parasite affections may be often found if shepherds would take the trouble to dissect a dead sheep. When found in one, the presumption is good that many are affected, for these parasites seldom appear in individual cases only. As a preventive, when feared, plenty of salt should be allowed, and the following prepared to be given once in two weeks.

No. 16.
2 Lbs. common salt,
1 Lb. sulphate of magnesia,
½ Lb. sulphate of iron,
½ Lb. powdered gentian,
Mix:

This is sufficient for 80 to 100 sheep to be given in ground feed.

Dr. Tellor says: Ordinary wood soot, as it can be collected from the chimney is a very efficient vermifuge, often used, both in children and the lower animals. It may be mixed with salt, or sprinkled on the fodder. Another cheap and useful vermifuge, in the form of a drink, is—

No. 17.
1 Lb. quick lime,
5 Oz. sulphate of iron.

Mix with five gallons of water, and give a pint twice a week.

As a vermifuge in round and thread-worms, the shepherd may use—

No. 18.
2 Oz. linseed oil,
¼ Oz. oil of turpentine.

For a drench.

For tape worm, the following:—

No. 19.
½ to 1 Drachm, powdered areca nut,
10 to 20 Drops, oil of small fern.

Give in molasses and water, and follow next day with a purge.

The Rot, or Liver-Fluke.

This is a disease caused by flat worms, (*Fasciola hepatica*,) in the liver. If by rubbing the skin of a sheep backward and forward at the small of the back as taken between the thumb and fingers, it is soft and flabby and there is a crackling feeling in the fingers, as if there were water underneath; if there is weakness and tenderness about the loins; if the belly swells, and the eye becomes jaundiced; if there is a diarrhea, a weak heart and general stupor, and no veterinarian is near, isolate the animals in a high dry pasture, give abundant and nutritious food and prepare the following:

No. 20.
½ Lb. sulphate of magnesia,
3 Drachms oil of turpentine.

Mix for a drench, and give every two days, one-third of the quantity at a dose.

The following is an English remedy and said to be very effective:

No. 21.
1½ Drachms yellow resin,
1 Oz. oil of turpentine,
10 Grains calomel,
30 Drops tincture of iodine.

For three doses, one to be given every morning for three days, in gruel.

Colic.

The best preventive is to keep sheep off of pastures liable to inundation, since the worm passes one stage of its existance in shell fish and water insects, which are carried into such pastures by floods, and the sheep get the germs with the grass.

Lush pasture to hungry sheep, ergot in fodder, musty or blighted grain, will produce colic or hoven in sheep as in cattle. The presence of gas is sometimes so strong as to rupture the walls of the rumen or third stomach. If the case is not serious, press and knead the stomach, and give the following:

No. 22.
2 Drachms sulphate of potash,
1 Oz. common salt,
1 Oz. sweet oil.
Mix in a wine glass full of water.

If the inflation is great, get a rubber tube, of half inch calibre, fasten a pledget of wool over the end to prevent clogging, oil thoroughly and introduce gently down the throat to the stomach. If this means fail and the swelling continues, remove the wool from the most prominent part and plunge a trocar into the stomach. If a trocar is not to be had use a common sharp pointed pen knife, and keep the orifice open by inserting a goose quill.

PART VII.

SWINE.

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

SWINE.

History, Breeds and Characteristics.

CHAPTER I.

HISTORY AND BREEDS.

ORIGIN OF THE HOG.——TEETH OF THE HOG.——IMPORTANCE OF SWINE TO MAN.——I. IMPROVED BREEDS OF SWINE.—ENGLISH BREEDS.—II. THE BERKSHIRES.——ESTABLISHING THE IMPROVED BERKSHIRE.——STANDARD CHARACTERISTICS OF BERKSHIRES ——III. NEAPOLITAN HOGS.——IV. ESSEX BREED.——V. YORKSHIRE HOG.—VI. SUFFOLKS.—VII. LANCASHIRE HOGS.—VIII. LANCASHIRE MIDDLE-BREED.—IX. LARGE LANCASHIRE —AMERICAN BREEDS.——X. POLAND CHINA.—XI. CHESTER WHITES —XII. JERSEY REDS.—CHESHIRES.—XIII. CHARACTERISTICS. —— RECAPITULATION OF BREEDS.

Origin of the Hog.

The great antiquity of the hog, *sus scrofa* of Linnæus, is fixed from the fact that remains of several fossil species have been found in the tertiary and diluvial deposits of Europe, and allied species in India. The wild hogs, from which the domestic breeds have taken their rise, are native of Europe, Asia and Africa, and are found wherever the climate is mild enough to afford sustenance in Winter, and in a domestic state wherever civilization has been extended. The fact of the origin of the domestic hog is well established from the fact that it will interbreed and continue entirely fertile, the succeeding fertility of the offspring, to the remotest generations, proving the homogeneity of the species.

In America, in Australia and in the Polynesian group, hogs were unknown until introduced. In England the wild species has long been extinct. In France they are nearly so, but in some parts of Germany, Denmark, Italy, Greece, and in Asia Minor they are still met with. In America swine are said to have been introduced into Hispaniola by Columbus in 1493; into Florida by De Soto in 1538; into Nova Scotia and Newfoundland in 1553, into Canada in 1608, and into Virginia in 1609. So great was the fecundity of swine in Virginian forests, that in eighteen years after their introduction the inhabitants of Jamestown had to palisade the town to keep them out.

Teeth of the Hog.

The domestic hog has, when full grown, forty-four permanent teeth, twenty-eight of which are preceded by temporary, or milk teeth. The teeth are classified as follows: Twelve incisors or front teeth, six in the upper and six in the lower jaw. The incisors in each jaw are divided equally, three on each side of the median line, of which the foremost are called the nippers; the next outside of these, intermediary incisors, and the remainder, outside of these are called corner incisors. Next in order are the four tusks, one on each upper and one in each under jaw on each side. The true grinders or molars are six in number, not including the so-called "wolf teeth," four in number, but which are now classed with the molars, making really seven on a side in each jaw. Each of the three hindmost molars in the four rows are permanent teeth, or not preceded by milk teeth. The three next in front of these appear soon after birth, one after another, and are called milk teeth (or premolars) and in the course of time are shed one after another, in the order in which they appeared, to give place for the permanent molars. These six molars are counted from the hindmost one forward. The seventh molar tooth, or the fourth premolar, appears later, in the space between the third premolar and the tusk. This small, apparently supernumerary tooth is sometimes called a wolf's tooth, and was once considered as an independent tooth, not belonging to the molars. It is now classed with the molars, to which it undoubtedly belongs. It is a permanent tooth, and is sometimes very small and imperfect, which is accounted for by the near proximity of the large and strong tusk.

The teeth of the hog may therefore be represented by the following formula: Incisors, six upper six lower; canines, one upper one lower on each side; wolf teeth, so-called, now determined to be molars, one upper one lower on each side; molars, six upper six lower on each side; in all 44 teeth.

To Tell the Age of Swine.

Furstenburg, a well known German authority, has given the following summary for determining the age of swine:

The animal is born with eight teeth—four corner incisors and four tusks.

On the eighth or tenth day appears the second or third temporary molar.

At four weeks old the four nippers appear—two in the upper and two in the lower jaw.

At the fifth or sixth week the foremost temporary molars appear in the upper and lower jaw.

At the age of three months the intermediary incisors have appeared above the gums.

At the sixth month the so-called wolf's teeth will have appeared; and at the same age appear the third permanent molars.

At the ninth month the following teeth will have appeared: namely the permanent corner incisors, the permanent tusks, and also the second permanent molars.

At the twelfth month the permanent nippers will be in view.

With the twelfth and thirteenth months the three temporary molars will have been shed, and their permanent substitutes, which, at fifteen months of age, will have fully appeared, are now just cutting through the gums.

With the eighteenth month the permanent intermediary incisors and the hindmost permanent molar will have made their appearance; and, with the twenty-first month, they will be fully developed.

Importance of Swine to Man.

Next to cattle, swine are the most important to man as an article of food. In the adaptability of pork for successfully standing long voyages, either barreled or smoked, in the value of lard for various culinary, lubricating and burning purposes, its place could not easily be supplied now.

As showing the importance of swine breeding in the United States, the following table is given, extending from 1871 to 1878 inclusive:

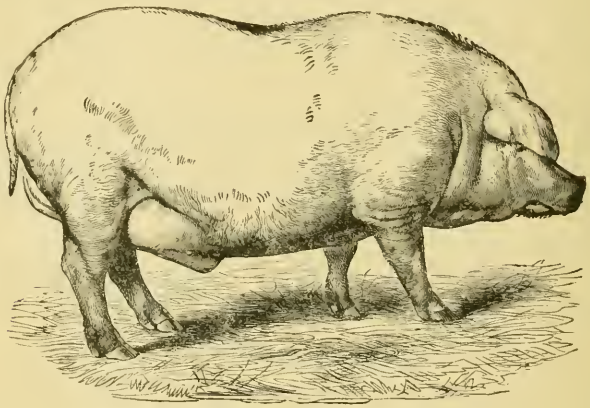
1871—29,457,500,	1875—28,062,200,
1872—31,796,300,	1876—25,726,800,
1873—32,682,050,	1877—28,077,100,
1874—39,860,900,	1878—32,362,500.

In the year 1878 the three greatest hog producing States were Iowa,

Ohio and Illinois; of these Iowa contained 2,244,800; Ohio, 2,341,411; and Illinois, 3,355,500 hogs. In 1878 there were packed in Chicago alone over 5,000,000 swine, or one-sixth the whole number raised in the United States.

I. Improved Breeds of Swine.

To the India hog, the Chinese and the Neapolitan is due more than to any other, the improvement in English breeds, and from those introduced into the United States are due our own American breeds, that have now become unexcelled in any quarter of the globe for the purpose for which they are intended: early maturity, aptitude to fatten at any age, and ultimate weight of the mature animal. Of these the Chinese hog has given great fattening propensities.

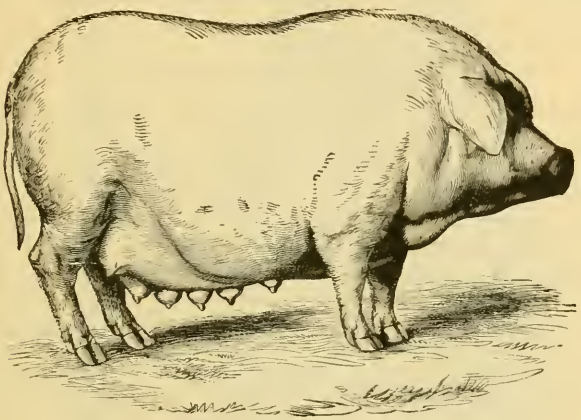


OLD CHINA BOAR.

The illustration we give will show first, the appearance of the boar as known years ago, and on the next page the sow. This breed has had a very marked influence as one of the bases of the Poland-China breed of the present day, and is said to have been introduced in the West, in Ohio, in 1816.

Civilization in China antedates that of all other nations. Hence it is quite probable that the systematic breeding of swine among that people antedates that of other ancient nations. This again is proved by the prepotency of the blood of this hog. It has formed the basis of im-

provement in all our modern breeds, both in England and America. In England its prepotency has been strongly felt in all the breeds and has transferred the long-legged, coarse-boned, elephant-eared, and big-headed swine of Old England into the deep-bodied, broad-necked, short-nosed, compact, and early-maturing Berkshire, Essex, Suffolk, Small Yorkshire and other representative breeds, which have been further improved by the



CHINA SOW.

infusion of Neapolitan blood, reducing the hair, hide and bone until now but little more is to be desired. And in our own country it has given us the Poland-China, Chester whites, improved Cheshires and New Jersey reds,'— breeds which may compete most favorably with any others in the United States.

English Breeds—The Berkshires.

This now magnificent breed has been bred in Berkshire, England and in adjacent countries from a very early day. Their origin is thus reported: The family of hogs in Berkshire, England, which was the foundation of the present improved breed, was of a sandy or buff color, about equally spotted with black; was of a large size, a slow feeder, and did not fully mature till two and a half or three years old. But as such it was very highly esteemed for the proportion of lean to fat in its meat, and for the superior weight of its hams and shoulders, thus rendering the whole carcass peculiarly fitted for smoking, for which purpose it was said to

excel all other English breeds. The improvement is reported to have commenced sometime during the last century, through the importation and crossing on the females of a Siamese boar. This breed was, in color from a jet black to a dark slate, or rich plum color; of medium size, quick to mature; very fine in all points, with short, small legs and head; thin jowls; a dished face; slender, erect ears; broad, deep, compact body, well ribbed up; extra heavy hams and shoulders; a slender tail; thin skin, and firm, elastic flesh.

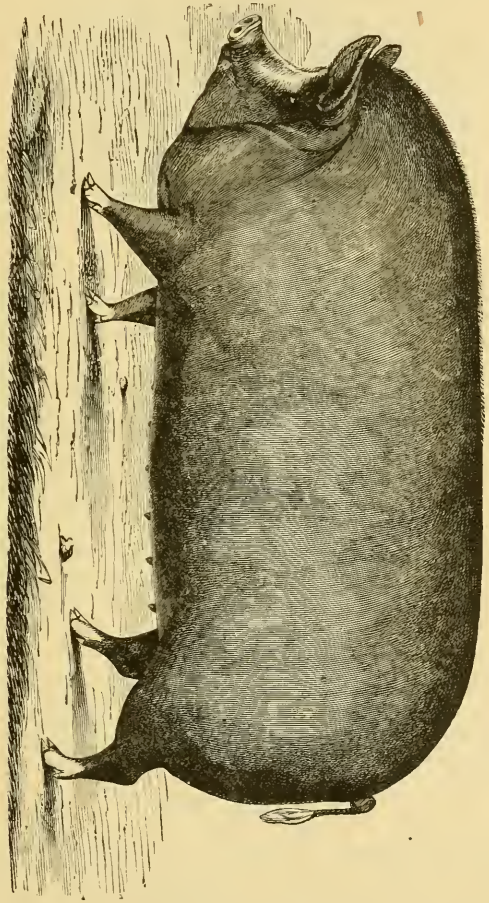
Establishing the Improved Berkshire.

After using the Siamese boar in Berkshire to the old style of females as long as it was considered best, he was discarded, and the cross pigs then bred together. In 1838 as we and others bred this swine in Illinois, they were in color a deep, rich plum, with a slight flecking on the body, of white, or buff, or a mixture of the two; having a small blaze in the face; two to four white feet, and more or less white hair on the tail. The plum color was preferred to the black or slate, because it carried rather higher style and higher points with it, and a superior quality of flesh, softer hair, and finer skin. Since that time the Berkshires have been much improved in style and compactness, but probably not in excellent meat points. In lean meat in the bacon pieces, and in superior hams and shoulders, they excel all other breeds. It must be acknowledged, however, they were always somewhat harder feeders than the best of the very fat breeds.

Standard Characteristics of Berkshires.

The following may be accepted as a standard of characteristics and marks: Color black, white on feet, face, tip of tail, and occasional splash of white on the arm. While a small spot of white on some other part of the body does not argue an impurity of blood, yet it is to be discouraged, to the end that uniformity of color may be attained by breeders. White upon the ear, or a bronze or copper spot on some part of the body argues no impurity, but rather a reappearing of original colors, by reversion. Markings of white other than those named above, are suspicious, and a pig so marked should be rejected. Face short, fine and well dished; broad between the eyes; ears generally almost erect, sometimes inclined forward with advancing age, always small, thin, soft and showing veins; jowl full; neck short and thick; shoulder short from neck but moderately deep from back down; back broad and straight, or very little arched; ribs long and well sprung, giving rotundity

of body; short ribs of good length, giving breadth and levelness of loin; hips good length from joint of hips to rump; hams thick, round and deep, holding their thickness well back and down to the hocks; tail fine and small, set on high up; legs short and fine, but straight and very



BERKSHIRE SOW.

strong, with hoofs erect and legs set wide apart; size medium; length medium, since extremes are to be avoided: bone fine and compact; offal very light; hair fine and soft; no bristles; skin pliable.

III. Neapolitan Hogs.

Sidney, in writing of the Neapolitan pig, says: "The Neapolitan pig is black, or rather brown, without bristles, consequently delicate when first introduced into our northern climate. The flesh is of fine grain, and the fat is said to be free from the rankness of the coarser tribes." Referring to the supposed descent of the breed from the wild boar of Europe, he adds: "It is more probable that the Neapolitans are the descendants of the dark Eastern swine imported by early Italian voyagers and cultivated to perfection by the favorable climate and welcome food." Neapolitan pigs have been for many years frequently taken to England. Martin credits the great improvement in English swine, which has taken place within thirty years, chiefly to the agency of the Neapolitan and Chinese breeds, conjointly, or to either alone. He names especially the Essex, Hampshire, Berkshire and Yorkshire, and to these Youatt adds the Wiltshire, and enforces Martin's statement as to the Berkshire and Essex. Their earliest introduction into the United States was in 1840–41. They seem, however, not to have been well bred specimens. About 1850 a Mr. Chamberlain of Red Hook, New York, made an importation direct from Sorrento. They were all of a dark slate color, and their pigs were like themselves and none with white, ash or drab color on them. The following may be accepted as a perfect description of this breed and their points:

Head small; forehead bony and flat; face slightly dishing; snout rather long and very slender; ears small, thin, standing forward nearly horizontally, and quite lively; jowls very full; neck short, broad and heavy above; trunk long, cylindrical and well ribbed back; back flat, and ribs arching, even in low flesh; belly horizontal on the lower line; hind-quarters higher than the fore, but not very much so; legs very fine, the bones and joints being smaller than those of any other breed; hams and shoulders well developed and meaty; tail fine, curled, flat at the extremity, and fringed with hair on each side; general color slaty, or bluish plum color, with a cast of coppery red; skin soft and fine, nearly free from hair, which, when found upon the sides of the head and behind the fore-legs, is black and soft, and rather long; flesh firm and elastic to the touch.

IV. The Essex Breed.

It is well known that the Neapolitan was a prime integer in the improvement of the Essex breed of swine. In comparing specimens of the two breeds one can see plainly the cross of a broad, deep, gross feeder with an animal of great delicacy and refinement—the cross proving, when es-

tablished, to combine those qualities which are of greatest value in the parent breeds, and being capable of imparting them to crosses with breeds less finely organized.

ESSEX BOAR.

The Essex originated in the south of England and are entirely black. They are small to medium in size, and are extensively used in England as crosses on the large coarse swine, with a view to improving their fattening qualities. The best specimens may be known by being black in color; face short and dishing; ears small and soft, standing erect while young, coming down somewhat with age; carcass long, broad, straight and deep; hams heavy, and well let down; bone fine, and carcass when fattened, mainly composed of lard; hair generally rather thin; fattening qualities superior. The black color of the Essex, as is the case with all the improved black swine, is only confined to the epidermis or scarf skin; when dressed the skin is beautifully white and clean. The cut we have given of the Essex boar, will very well represent the Neapolitan with the exception that the Essex is a comparatively well haired breed.

V. The Yorkshire Hog.

The Yorkshires are among the best of the pure bred swine of England, and have stamped their impress upon nearly all the modern white breeds. Their good qualities are: They are of a size, shape and flesh that are desirable for the family or the packer's use. They are hardy and vigorous in constitution, have a good coat of hair, protecting the skin so well either in extreme cold or heat that it rarely chills or blisters. They are very prolific and good mothers; the young do not vary in color, and so little in shape that their form when matured may be determined in advance by an inspection of the sire and dam.

The Yorkshire, medium or middle breed, says Mr. Sydney, is a modern

invention of Yorkshire pig breeders, and perhaps the most useful and popular of the white breeds, as it unites, in a striking degree, the good qualities of the large and small. It has been produced by a cross of the large and the small York and Cumberland, which is larger than the small York Like the large whites, they often have a few pale blue spots on the skin, the hair on these spots being white. All white breeds have these spots more or less, and they often increase in number as the animal grows older.

It was not until 1851 that the merits of this breed were fully recognized, when at a meeting of the Keighley Agricultural Society, the judges having called the attention of the stewards to the fact that several superior sows, which were evidently closely allied to the small breed, had been exhibited in the large breed class, the aspiring intruders were, by official authority, withdrawn.

The middle Yorkshire breed are about the same size as the Berkshire breed, but have smaller heads, and are much lighter in the bone. They are better feeders than the small whites, but not so good as the large whites; in fact, they occupy a position in every respect between these two breeds.

The Cumberland, a middle breed Yorkshire, are not distributed throughout the West, but when thoroughbred specimens have been introduced they are held in great esteem, as well for an animal for exhibition purposes as for family use. They are especial favorites with packers who buy their stock on foot for the reason that they yield larger proportionate net weights than any other hogs which grow large enough for their use. They are small in bone but large in flesh, of the very best quality, evenly and proportionately distributed over the whole frame.

VI. The Suffolks.

The Suffolks owe nearly all their good qualities probably to the infusion of Yorkshire blood.

Mr. Sidney says that Yorkshire stands in the first rank as a pig feeding county, possessing the largest white breeds in England, as well as excellent medium and small breeds, all white, the latter of which, transplanted into the south has figured and won prizes under the name of divers noblemen and gentlemen, and under the name of more than one county. The Yorkshires are closely allied to the Cumberland breeds, and have been so much intermixed, that, with the exception of the very largest breeds it is difficult to determine precisely where the Cumberland begins and the Yorkshire ends. The Manchester boar, the improved Suffolk, the improved Middlesex, the Caleshill and the Prince Alberts or Windsors were

all formed on Yorkshire-Cumberland stock, and some of them are nearly pure Yorkshires, transplanted and re-christened Speaking of the pigs kept in the dairy district of Cheshire, he says that white pigs have not found favor with the dairymen of Cheshire, and the white ones most used are the Manchester boars, another name for the Yorkshire-Cumberland breed. All the writers who have followed him down to the latest work published on the subject, occupy space in describing various county pigs which have long ceased to possess, if they ever did possess any merit worthy of the attention of the breeder. Thus the Norfolk, the Suffolk, the Bedford and the Cheshire have each separate notice, of which the Suffolk alone is worthy of cultivation, and the Suffolk is only another name for a small Yorkshire pig.

We submit also a brief description of the Suffolk's "points:" Head small, very short; cheeks prominent and full; face dished; snout small and very short; jowl fine; ears small, thin, upright, soft and silky; neck very short and thick, the head appearing almost as if set on front of shoulders; no arching of crest; crest wide and deep; elbows standing out; brisket wide, but not deep; shoulders and crop-shoulders thick, rather upright, rounding outward from top to elbows; crops wide and full. Sides and flanks—ribs well arched out from back, good length between shoulder and ham; flank well filled out and coming well down at ham. Back broad, level and straight from crest to tail, not falling off or down at tail; hams wide and full, well rounded out; twist very wide and full all the way down. Legs and feet—legs small and very short, standing wide apart, in sows just keeping the belly from the ground; bone fine; feet small, hoofs rather spreading; tail small, long and tapering. Skin, hair and color—skin thin, of a pinkish shade, free from color; hair fine and silky, not too thick; color of hair pale yellowish white, perfectly free from any spots or other color. Size small to medium.

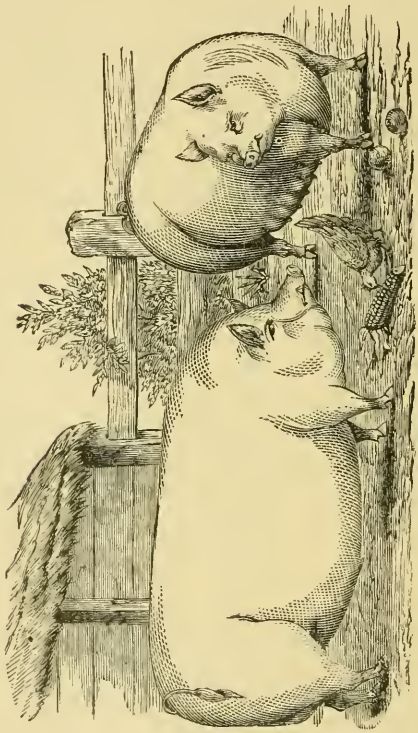
VII. Lancashire Hogs.

There are three breeds in Lancashire, England, that have attained celebrity, namely, the short-face, the middle breed, and the large Lancashire white. On next page we give an illustration of the short-faced breed.

This breed of swine may be known by the following characteristics: The shortness of the face from the eyes to the end of the snout; prick ears; small bones; a good coat of white hair; cubic in form, with broad back and broad hams, well let down. The skin, as well as the hair, is white, although an occasional one may be found with a few dark blue spots in the skin, but never dark or black hairs. The small breed hogs

must have small bones; a short face; silky hair; fine, small, upright ears; a comparatively square form; must have good square hams, the most valuable part of the hog; must carry the meat near the ground; flat on the back; straight and cubic in form.

VIII. Lancashire Middle Breed.



SHORT-FACED LANCASHIRE HOGS.

This breed is one which partakes of the quality of the small breed and the size of the large breed. Middle bred hogs are got by crossing large bred sows with small bred boars, but all attempts to attain the same results by reversing the operation, and putting large bred boars to small bred sows, have proved failures. The largest of the middle bred sows are used

to improve the large breed. A middle bred hog must have a short face, and all other good qualities of the small breed, except that they may be longer in proportion to their width; must have thicker legs and longer bones to carry the greater size; should be well haired (fattening to full form often causes the hair to fall off, which must be allowed for.) As good a *short* rule as can be adopted to judge them by is as follows: The best middle bred hog should have the greatest possible share of all the qualities of the small breed, with the length, and, in a measure, the larger bones of the large breed.

IX. Large Lancashire.

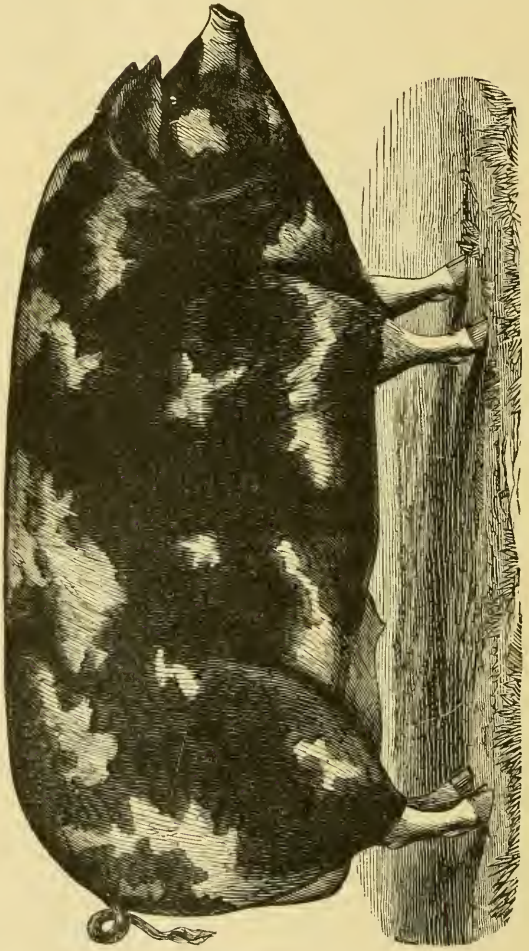
This variety of swine have large bones, of great height and length, and are the largest breed of swine known. They are a true breed, their qualities have descended from generation to generation—the quality being improved by judicious selection. They must be of large size; great length; flat back, with large square hams, and when fattened, must carry their width of back along over the hams; must have deep and tolerably straight sides; large feet and leg bones; hair short; may have a long face, but it had better be short, as they fatten better; may have a large, drooping ear, but other quality and size being equal, an upright, smaller ear is preferred. They usually have a long, thick, strong tail. They must be of great weight when fattened.

American Breeds.

Sagacious breeders in the United States nearly fifty years ago, saw the necessity of establishing breeds of swine that should be eminently adapted to the especial requirements where Indian corn and grass must necessarily form the principal food of the swine from weaning time until slaughtered. Then and until the last twenty years, mere fat was the important product in swine, as it was in a degree in cattle. Since that time the universal introduction of petroleum has reduced the value of lard and tallow to a minimum. Improvements in the art of preserving food fresh has made barreled pork, a less necessary product even for long voyages, and the attention of the breeders was again turned to the production of as much lean meat in their hogs as possible. This naturally led to a reduction in the weight of the hog, or at least, if the animal should be capable of reaching a heavy weight at maturity, it must also possess the important quality of fattening at any age. This has now been fairly met in the best English and American breeds. If we were asked to choose the breeds from each which would produce the most lean meat for the carcass, we should say the Berkshire of English breeds, and the Poland of American breeds.

X. Poland China.

Over the history and characteristics of this breed there has been much



POLAND-CHINA BOAR.

controversy. Individual breeders have sought to take undue credit to themselves in the establishment of the breed, and have sought undue

prominence by attaching their own names to the swine of their breeding. The facts are, the name Poland-China is a misnomer so far as Poland is concerned, for there is not a particle of evidence that a distinctly Polish breed of hogs ever gave an infusion of blood. The nearest evidence—and this traditionary—to this effect, is, that long ago a sow was bought of a Polander, which, proving an excellent breeder, it went by the name of the Polander sow. The breed is now largely indebted to the Chinas and Berkshires, for their good qualities. Although they certainly have an infusion of so called Irish grazier in them. Why this breed should have been called grazier, one can only surmise. They certainly were anything but grass eaters, but the name made them popular for a time in the then far West where grain at that time was scarce. The facts are, the Chinese hogs, imported into Ohio in 1816, and bred upon the best native stock of the country are the basis of the breed. In 1835 the Berkshire was introduced, and in 1839 or 1840 the Irish grazier. These were extensively used by the best breeders, on the best descendants of the China crosses. Since 1842, there is good evidence to show that new blood has not been introduced, but by careful selection, and judicious breeding, in Ohio and the West, or, by occasional judicious infusion of Berkshire blood, they now leave little to be desired, as a heavy, well meated breed, that will fatten kindly at any age.

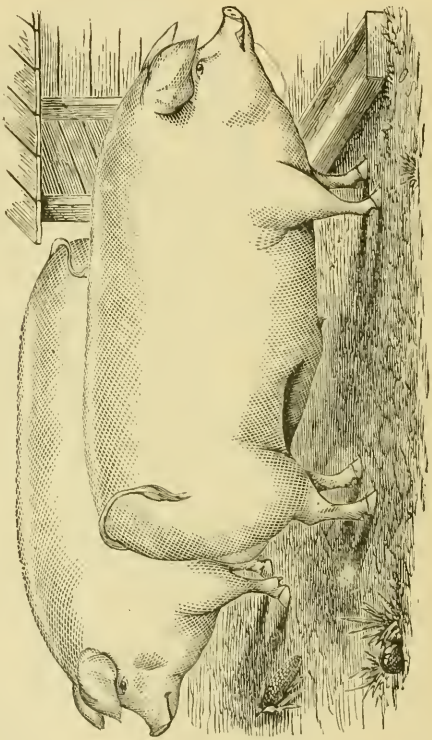
Characteristics of Poland-China.

The best specimens have good length, short legs, broad, straight backs, deep sides, flanking well down on the leg, very broad, full, square hams and shoulders, drooping ears, short heads, wide between the eyes, of spotted or dark color; are hardy, vigorous and prolific, and when fat are models, combining the excellences of both large and small breeds.

XI. Chester Whites.

The Chester Whites originated in Chester county, Pennsylvania, about 1818, through the importation of a pair of fine pigs from Bedfordshire, England, by Captain James Jeffries. These were inter-bred with the best stock then existing in that county, and by careful selections a permanent strain of large, easily fattened, quiet hogs were produced, which continued to breed with great uniformity. Something like thirty years ago some attempts were made to cross the Suffolk and Berkshire upon them, but it was discontinued as not being considered an improvement, and the best specimens to-day should be pure white, with no black about them whatever.

In the West this breed became very popular some years ago, and still is in many parts of the Northwest. Farther south, however, in the true corn zone, pure white hogs of any breed are not favored. They are thought not to stand out-door usage so well as black or nearly black swine. Where great weights are required the Chesters will always be liked.



CHESTER WHITE HOGS.

The following may be given as the characteristics of these hogs: Head short and broad between the eyes; ears thin, projecting forward and lopping at the point; neck short and thick; jowl large; body lengthy and deep; back broad; hams full and deep; legs short and well set under the body; coat thin, white and straight; (if a little wavy it is no objection). The tail should be small and with no bristles.

XII. Jersey Reds.

This large and rather coarse breed of hogs have been somewhat disseminated in the West. They are certainly a hardy breed, and well adapted to new countries where there is good range and mast. Their history seems to be as follows:

The positive origin of this family of swine is unknown. They have been bred in portions of the State of New Jersey for upwards of fifty years, and with many farmers are considered to be a most valuable family. They are of large size and capable of making heavy growth, 500 and 600 pounds' weight being common. They are now extensively bred in the middle and southern portions of New Jersey. In some neighborhoods they are bred quite uniform, being of dark red color; while in other sections they are more sandy and often patched with white. They are probably descended from the old importations of Berkshires, as there is no record of the Tamworth, the red hog of England, ever having been brought into this country, nor is this likely, as the Tamworth was not considered a valuable breed, and was confined to a limited area. The Reds resemble the old Berkshires in many respects, but are now much coarser than the improved swine of this breed.

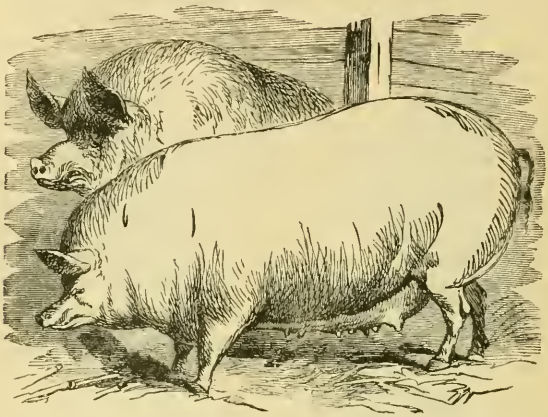
A good specimen of Jersey Red should be red in color, with a snout of moderate length, large top ears, small head in proportion to the size and length of the body, standing high and rangy on their legs; bone coarse, having tail and brush and hair coarse, inclining to bristles on the back.

XIII. Cheshires.

This is a comparatively modern breed, if indeed it is yet fully enough established to be called a breed. It has been somewhat disseminated in various parts of the United States, and for villagers and small farmers, possesses about all the good qualities of the Suffolk, without some of their disabilities. They are said to have originated in Jefferson county, New York, from a pair of pigs sent from Albany under the name of Cheshire. It was probably a pet name for an exceptionally good pair of pigs. Since then they have been crossed with Yorkshires and other pure white breeds, until of late years by selection they have become uniform in their make up.

The so-called Cheshires are pure white in color, with little hair. They are not uniform in this respect, as pigs in the same litter differ widely in the amount of hair. The snout is often long, but very slender and fine. The jowls are plump, and the ear erect, fine and thin. The shoulders are wide and the hams full. The flesh of these hogs is fine-grained, and

they are commended on account of the extra amount of mess pork in proportion to the amount of offal. The tails of the pigs frequently drop off when young.



IMPROVED CHESHIRE.

Recapitulation of Breeds.

The principal English breeds are as they were known twenty years ago, the Berkshire, the Essex and the Yorkshire. The Berkshire is a medium breed weighing at full maturity up to 500 pounds. There are large and small Berkshire, but the medium family is the most valuable. They are now bred entirely black except a dash of white in the face and white feet.

The Essex is all black, or rather a blue black, and will weigh up to 450 pounds at maturity. They are one of the most stylish of the small English breeds, as they are the largest of the small breeds, and to our mind the best of the small breeds for the West—quite good feeders, handsome and making good pork.

The Yorkshires are divided into three classes, small Yorkshires, medium Yorkshires, and large Yorkshires. The so called Prince Albert Suffolks are small Yorkshires, and the best of the small white breeds. All the Yorkshires have occasional dark spots on the skin. The hair, however, is white, and these dark spots are not indications of impurity of blood but rather the reverse.

The American breeds, in the best repute, are first, the Poland-China,

sometimes called, in Ohio, Magie. Twenty years ago they were coarse black and white hogs, with occasional sandy markings. Of late years they have been, through careful breeding and selection, refined, and are now bred in the West, nearly black, the white, in the most approved strains, being distributed pretty equally over the head and body in flecks and irregular patches. They are the most widely distributed of any American breed in the West, and fully deserve all that is claimed for them, as large, quiet, early matured, and kindly feeding hogs.

The Jefferson county, New York, so called Cheshires, are, as before stated, but modified Yorkshires, but in every respect stylish hogs, feeding well and making good pork, and are well adapted for small farms and for feeding in pens. The so called Hospital breed, or Morgan county hog of Illinois, which some years ago gained considerable repute, are undoubtedly, modified Yorkshires, and in no respect superior to that well known breed. They were produced by crossing the Suffolk on the best white hogs of that county. Within the last five years they have ceased to attract attention.

CHAPTER II.

BREEDING AND MANAGEMENT.

IMPORTANCE OF SWINE. —— A BACK WOODS HOG. —— FIXING AND HOLDING THE CHARACTERISTICS. —SELECTION ALWAYS IMPORTANT —— BREEDING AGE OF SWINE. —— CARE OF BREEDING SOWS. —— WEANING. —— MANAGEMENT OF SWINE. ——ABSOLUTE CLEANLINESS NECESSARY. ——SUMMARY.

Importance of Swine.

The breeding and management of swine constitutes one of the most important agricultural interests in the West, and should do so in the South. To be successful none but the best breeds should be allowed on the farm. The fecundity of swine leaves no excuse for holding on to land pikes and the descendants of semi-wild breeds that must be run down by dog and rifle, in order, when they are killed to get a small quantity of inferior meat. A boar of any of the improved breeds will be sufficient for six or eight sows, and the increase is so astonishing when there is no epidemic disease, that it would from a single pair take but three years to stock the largest farm. It should be unnecessary to pursue this matter further. There is no class of farm stock that pays better, as between indifferent and good breeds, than hogs, and the wonder is that in some sections of the country farmers still cling to a breed of grunters that will always greet you with a snort and a boh-o-o, and which no feeding can fill—in fact animals like those shown on the following page—fully a match for the average dog, always hungry, ready to eat anything that falls in their way, even to half grown children occasionally, but which when wanted for meat are nowhere within shooting distance.

The very first requisite, however, in keeping any improved breeds, or in fact any breed from which money is to be made, is the best of feeding, and that daily, from the time they are born until they are slaughtered.

A BACK WOODS HOG.

The hog is simply a machine for making what is to be converted into lard, bacon, salt pork and hams. The average daily gain is a gradually decreasing quantity from month to month, until after a certain time nothing more can be gained in weight. This ought to be sufficient to be said upon this point. You can neither breed, nor keep a breed profitably by starving or allowing them to shift for themselves.

Fixing and Holding the Characteristics.

In breeding swine, however good or perfect the breed, they will surely degenerate unless the greatest care in selection is pursued. Many persons wonder why it is that from the prolific nature of swine, the country is not soon stocked with none but the most superior animals. The simple reason is, the want of accurate judgment and care in selection; the error will be plainly seen by noting what we say farther on.

Selection Always Important.

In animals usually having but one young at a time, the progeny pretty uniformly partake of the nature of both parents, and are bred with tolerably uniform results. In animals producing a number of young at a time, the progeny will be found to vary very considerably in the same litter. Thus the selection of those specimens that partake of uniform and characteristic excellence becomes of the first importance, since unwise selections will result in carrying the breeder farther and farther from the excellent points to be perpetuated. Again, heredity, that is throwing back to an original type, or rather in the sense in which we use it, inheriting certain fixables, as constitutional vigor, inclination to fat, etc., is shown far more clearly in animals having many young at a time, than those having only one young. The progeny will not only vary more in particular animals, but certain characteristics will reappear by reversion after a greater number of generations, in animals having many young at a time, and to a greater degree than in those usually having but one. At least such is our experience. Hence, as we have stated, absolute necessity of the strictest care, is not only necessary in breeding, but in the selection of animals for future breeding.

In domestic animals it is a matter of common observation that the temper and other peculiarities of individuals are determined by inheritance. Thus, virtually, quietness of disposition, or mildness, tractability or viciousness, courage or timidity, are constantly shown. Now from the general law that like produces like, and the well determined law that variation is a constant integer in all cross bred animals, and from our own observation that it is often intensified in animals having many young at a litter, the full force, as regards judgment in selection will be apparent; and the fact that the country is not soon filled up with superior breeds of hogs is due mainly to the want of proper care in the selection of the breeding animals, and also from a lack of accurate knowledge and ability to nicely discriminate by the breeder, in regard to form, constitutional vigor, and excellent points in the young animals selected as breeders. Absolute accuracy in this respect is in fact possessed by but few individuals in a generation. There must first be a natural tact inherently possessed and digested and matured by years of study and observation.

Breeding Age of Swine.

The sow is capable of breeding at about seven months of age, and the boar is fit for service at the age of one year. As a rule, however, the sow should not be allowed to farrow under the age of fifteen months, and the boar is not fit for continued service until he is eighteen months old.

The sow may, under exceptional circumstances, be made to breed three times in a year, but two litters are all that should be allowed. Many of our best breeders do not allow but one litter a year, where the produce is simply required for making pork, and under certain circumstances this is not incompatible with economical management.

A Warm Farrowing Place Necessary.

The young pig is even more tender than the new-born lamb. If they get chilled before they suck it is difficult to save them. Where there are good conveniences for warming the farrowing pen, sows may have their first litter in March, and if put with the boar the fourth day after farrowing they will generally receive him. This will bring the next litter in the Summer, a very good time for pigs to be wintered. If the sow do not catch the first time she will not come in heat until the pigs are weaned. Yet this will not throw the next litter later than September. If good facilities are not had for keeping the early litters warm, the farrowing had better be deferred until May, or at the time of grass, according to the latitude.

Gestation.

Gestation continues about four months. Three months, three weeks and three days is considered the average time, and it is not far out of the way. A variation will sometimes be found of thirty days. Young animals, and those of feeble constitutions carry their young for a shorter time than mature and strong animals, and sows usually remain prolific for five or six years, and unless they get overloaded with fat, old sows are more constant and careful mothers than young ones.

Care of Breeding Sows.

The sows that naturally have a strong tendency to fatten may be bred at nine months old, and should be kept breeding pretty steadily, and be fed only sufficient to keep them strong and in fair flesh. During gestation the sows should be kept in good heart but not fat. When potatoes are plenty they can be substituted boiled, and in connection with milk will be most excellent feed. In any event they must have plenty of succulent food—clover, pig-weed, or other green food in Summer, and roots of some kind in Winter. We have always kept a patch of artichokes for Fall and Winter, when the ground was not frozen for them to root and amuse themselves in. The practice of ringing breeding sows to keep

them from rooting is vicious in the extreme. We have never practiced it at all with any hogs. To remain healthy they must root some. It is their natural instinct. If the pasture be clover, and in the rotation to be followed with other crops, the damage by rooting will be light in comparison with the health of the swine.

When the sow is near her time her food should be of such a nature as to keep up her strength and give due sustenance to the young but not stimulating. When the pigs are three or five days old, and danger of inflammation is past, feed liberally, and with rich sloppy food to induce a good flow of milk. But under no circumstances feed so as to make the young pigs unduly fat. Skimmed milk and the mill refuse of wheat, what is known as mill feed, is best, but in the absence of this potatoes, pumpkins and other roots in the Fall, or boiled beets in the Spring, with corn meal enough to keep the sow in good heart, makes admirable food When there is grass to be had, the sow should be allowed all she will eat. Thus you may get the very best results both in the health and continued usefulness of the sow, and the constitutional growth and vigor of the young pigs.

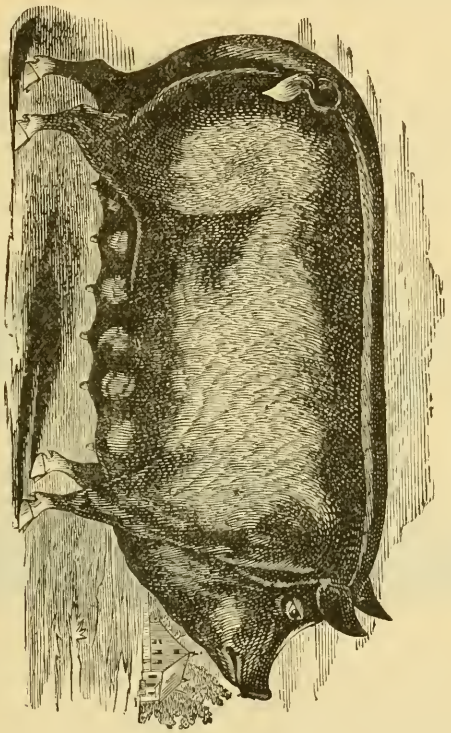
Weaning.

The young pig as we have shown is born ready for work. That is, it has teeth that in a short time are competent to grind and prepare food for the stomach. We should wean at six weeks old, allow all the skimmed milk and butter-milk possible to the growing pigs, and with it after the pig is two months old, a fair proportion of ground wheat skimmings, or light rye, barley, etc., ground and made into mush, to be mixed with the milk as a tolerably thin slop. Teach the pig early to eat grass, and at three months old he will take care of himself on good pasture with all the corn he will eat at night.

At the age of two or three weeks the pigs should be gelded, so they may be well over the difficulty before weaning time. Keep rings out of the noses of young pigs. They have been the means of spreading contagious diseases. We prefer slitting the cartilage of the nose, or cutting a notch in it at the time of gelding, if it is absolutely necessary that they do not root. At all events it is time enough to do the ringing the second year, if to be kept over. But by proper care if the litters of pigs come early, any of the better breeds may be turned off the next Christmas, and from this time until the first of February, become fat, and of as heavy weight as is profitable in the markets.

Management of Swine.

Hogs are not susceptible to cold when fat. Nature in denying them much hair, has provided them with a thick layer of fat under the skin that acts in the same manner to the skin outside as a covering of hair in other animals. It has also given them the instinct of providing themselves



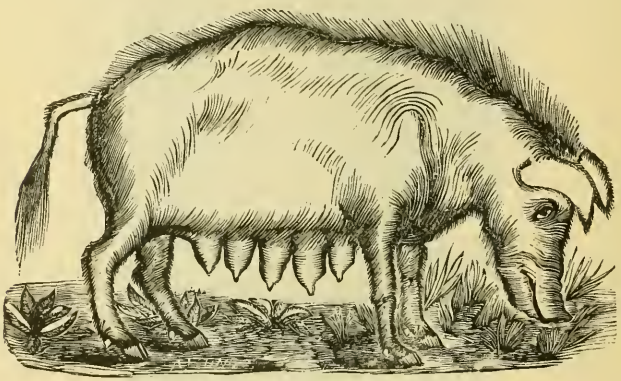
BERKSHIRE SOW. BREEDER.

warm beds in sheltered situations in which to lie, and, in addition, given them the inclination to lie together in considerable numbers; and kept together, with insufficient shelter, they will pile together in such numbers as to over lie each other, by which the weaker ones are often smothered. We have known those who considered themselves sensible men, to get up in cold winter nights and go to the hog yard and separate the drove,

when so piled. It is about on a par with the whipping and dogging of cattle about a yard at night to get up warmth. A more sensible and cheaper plan would be to provide comfortable quarters, where they might lie warm, and separate them into gangs, according to age and strength. Thus with plenty of fat next the skin, and good liberal feeding, very little difficulty will be experienced, in keeping them growing steadily, until of a sufficient age for the slaughter pen.

Absolute Cleanliness Necessary.

Of all farm animals hogs especially must have plenty of water. It should also be pure. Swine breeders can not too soon disabuse themselves of the idea that swine are dirty, or filthy feeders, or that they naturally incline to wallow in the mud. There are no farm animals nicer in the food they eat than swine if allowed to be. It is true, they are



HAZEL-SPLITTER.

omnivorous feeders. So is man. Like man, although they eat fish, flesh, fowl, vegetables, roots, and grain, they like it fresh. If forced by hunger they will eat disgusting substances, so again will man. The elephant, the rhinoceros, hippopotamus, and tapir, seek the water to clean and cool themselves in Summer, like all pachydermatous animals. The wild men like swine will cover themselves with mud to ward off the attacks of biting and stinging insects. In their wild state the nearest tree furnishes to swine the means of rubbing it off when dry, and the rubbing post furnishes them the means of cleaning their skins in a state of domesticity.

If kept from the attacks of flies, they will not wallow in the mud but in the cleanest water they can find, and stagnant water they will not drink at all, unless forced to do so, by dire necessity.

The sagacious breeder and feeder will understands this; they also understand the danger of malignant diseases attacking their swine when forced to wallow and drink impure water. Hence they strive by every means in their power that swine are kept away from these causes of disease and death, and thus such would be almost entirely exempt, except that there are always men enough of the shiftless type in a neighborhood whose stock take and spread contagion to their neighbors. We do not know how we can illustrate more forcibly the two types of breeders than by the cut given of a sow of an improved breed properly kept, and of a sow of the "hazel splitting" variety, improperly kept. The one in a dry, firm pasture, with plenty of pure water, the other on a half marsh, and apparently made to succumb from miasmatic influences.

Summary.

Hogs, and especially pigs in confinement often suffer for want of water. No matter how sloppy the food they should always have pure water within reach. If they can have a bathing place in Summer it will add much to their health, and assist much in fattening. Swine, in confinement, should always have charcoal, bituminous coal, salt and wood ashes within reach. They often suffer from acidity of the stomach and the remedy being near the swine will always use it.

Oil cake mixed with the feed of swine when suckling pigs, a gill a day, assists the milk secretion. It should not be given to pigs. As they begin to eat they should have a trough where they can go and feed but which the sow cannot get at.

Bran is not valuable for swine. Where highly concentrated food is given it is well to have a little dry bran in a separate trough, so the hogs can take it when they want it.

If ordinary diarrhœa attacks pigs give a porridge of sweet skimmed milk and flour. For constipation give two or three drachms of soap dissolved in an ordinary sized tumbler of water, and repeat if necessary in eight hours, or give as an injection. It is also a good diuretic and for acid stomach.

Provide a strong scratching post. Bore inch and a half holes at intervals to accommodate hogs of different sizes, and drive in pins letting them project an inch and a half.

Castrate pigs before they are weaned, say not later than two weeks before weaning time.

CHAPTER III.

FEEDING AND SHELTER.

GOOD VS. BAD FOOD.——SUMMER FEEDING.——OTHER SUMMER FOODS.——ROOTS. ——THE GRAINS. —— FEEDING SOUTH. ——MAST. —— FEEDING IN CONFINEMENT.——HOG BARNS. —— A CROSS BARN. —— A SIMPLE PEN.——SUMMARY. ——LIGHT VS. HEAVY HOGS.

Good vs Bad Food.

Vegetables and grain are the basis of success in the making of pork whatever the breed may be. Hogs kept about large stables or distillery yards, where they get only offal, or fed in butcher's yards, on the refuse offal of the slaughter house, are unfit for human food. They are liable to become infested with trichina, and, therefore, no breeder and especially no feeder should buy animals from such localities. In fact there is only one redeeming feature among the disgusting filth and nastiness in which they are fed—they are generally provided with pure water, and warm shelter.

Summer Feeding.

Pasturage is of the first importance. This should be ample. In pasturing swine, but few varieties of grass are required. Clover, both white and red, will be the main reliance. In all that region where red and white clover are not natural to the soil, and where alfalfa (lucerne) and other members of the pulse family do well, these may be substituted. Swine take kindly to blue grass, when it is young, and to orchard grass. They do not refuse timothy, but timothy has a bulbous root just at the surface of the earth. This swine eat, and thus destroy the grass. Rye

and oats make good pasturage for hogs. Rye grass and foul meadow grass are also well relished. In this respect the feeder should experiment with grasses, to be cut and given in the pen, and then feed to such varieties as do best, and are most eagerly eaten. Of weeds, purslain, (*portulaca oleracea*), lambs quarter, also called pigweed, (*chenapodium album*) and the green amaranth, also called pigweed, (*amarantus hybridus*) are the most common of our native and introduced weeds that are valuable as green food for swine. There is also a native weed growing in Illinois and along the alluvial banks of the Mississippi and northward; the winged pigweed, (*cycloma platyphyllium*) that is much liked by swine. Yet the list of plants eaten by them is not large, about eighty species comprising the whole.

Other Summer Foods.

Besides clover, the grasses, and weeds, there are other plants that may come in during the Summer, and be used with profit. Oats and peas may be sown together, two bushels of oats and one of peas, together, per acre, as early in the Spring as the ground is in fair condition for working. The swine may be turned into the field when the crop is ripe, being confined to given space, by a hurdle fence, which is to be removed as they eat clean. A better way, however, is to harvest and thresh, and feed either soaked or dry. Later, Summer squashes and pumpkins will come in, to be followed by artichokes in the Autumn. We do not advise any of these foods except grass on the score of economy. Corn and grass are the cheapest food in all the West, so far as mere cost of production is concerned. But unless the health of swine is retained, there is no profit. Hence the necessity of these additional foods.

Roots.

Rutabagas make an excellent Winter food for swine in connection with corn; they are easily and cheaply raised, as we have already stated. Parsnips are also generally liked, either raw or cooked. Beets are also a good Winter feed boiled with meal. The tops are also occasionally relished. Cabbage is a cheap and wholesome food; they are not, however, cheaply kept over Winter. They may be used with profit up to the first of January.

The Grains.

These, after all, must be the main dependence, both in raising and fattening swine. The kind of grain fed will, of course, depend upon the

climate and region where raised. Where corn is a sure crop, it must be relied on almost entirely. The assertions of theorists, that it is unfit for feeding, except during the short fattening season, although the merest twaddle, in the sense they intended it, will, from another point of view, be correct. The fattening season of swine should be from the time they are weaned until they are slaughtered. Swine for pork should never lose in condition from the time they were born until turned off for the butcher. The feeding of all the corn they will eat in connection with grass and other food, to keep them healthy, and which will apply with equal force, whatever the grain fed, will be found not only the most economical throughout the West and Southwest, but in all that region of country where corn is natural to the soil and climate, or where it may be cheaply bought.

Feeding South.

In nearly all the country South, corn may be cheaply raised as a part of the rotation. Here corn must be the main stay, supplemented by such grasses and plants as are natural to the region. The artichoke will do well much further south than is generally supposed, and some of the tuberous varieties may undoubtedly be found well down to the tropics. When it can be profitably cultivated, the Jerusalem artichoke should be used. The name Jerusalem is a corruption of the Italian name Girasole, meaning sunflower, the botanical name being *Helianthus tuberosus*, or the tuberous rooted sunflower.

Chafas, a tuberous rooted grass, (Cyperus), has become widely naturalized in the South, and is highly spoken of for feeding swine, since like artichokes, the hogs are left to gather them for themselves, and unlike the artichokes, they are most nutritious and fattening. They are exceedingly easy to cultivate, but are sometimes said to be difficult to extirpate South. This, however, is probably incorrect, since from their very nature, a thorough Summer fallow will kill. North of thirty-nine degrees they do not survive the Winter. In fact, if frozen anywhere, they are killed.

Mast.

In all the great timbered region South, tree seeds, acorns, beechnuts, chestnuts, the softer shelled hickorynuts, and hazelnuts, form a most valuable food for swine. They should be utilized to their fullest extent. So papaws, persimmons, and the other wild fruits of the forests South, may be made available in the making of pork. Where hogs can have

plenty of range, they will do very well with a little feeding, are generally entirely healthy, and upon being put up to fatten, a very little grain suffices, if only attention has been paid to get the proper breed. For the South, we believe the Berkshire, or crosses of the Berkshire on the best native sows to be one of the most profitable breeds. The Poland-China of American breeds will be found most valuable for the South.

Feeding in Confinement.

In all the great swine growing regions, where from twenty-five to five hundred hogs are annually fattened and sold from single farms, the life of the animals must necessarily be passed out-of-doors. So far as the breeding stock, and the first few months of the life of the pigs are concerned this is always best, both from an economical and sanitary point of view. There are, however, many small farmers, who annually fatten, from what they require for family use, up to fifteen or twenty head a year, who find it most convenient and economical to feed and fatten both in Summer and Winter in pens. All this large class must depend, first, on the skim milk, buttermilk and whey, and upon the slop of the kitchen for feeding; second, upon clover, cut and fed, weeds and other refuse material about the farm, and lastly and principally on corn either ground or raw. It is better for all this class that the pens when built be planned so as to combine ease of handling with security and comfort of the animals.

Hog Barns.

The hog house need not be an expensive building. For a few hogs it may be in the form of a parallelogram, with a passage way in the middle five feet wide, with pens opening into roomy yards outside. Each pen should be provided with a swing door, hinged at the top, so the hogs in passing out and in may raise and lower it themselves. This they soon learn to do. The pens may be about eight feet by ten feet, which, if kept clean, will accommodate three or four hogs each. Thus, a range of pens on each side ten feet deep and a five feet passage way between will require a building twenty-five feet wide. A square building of this size will feed twenty-four hogs. If a less number is required to be fed the building may be twenty-five feet one way, and, say sixteen feet the other way, allowing for pens. If fifty hogs are to be kept it will require six pens on a side and the building must be twenty-five by forty-eight feet.

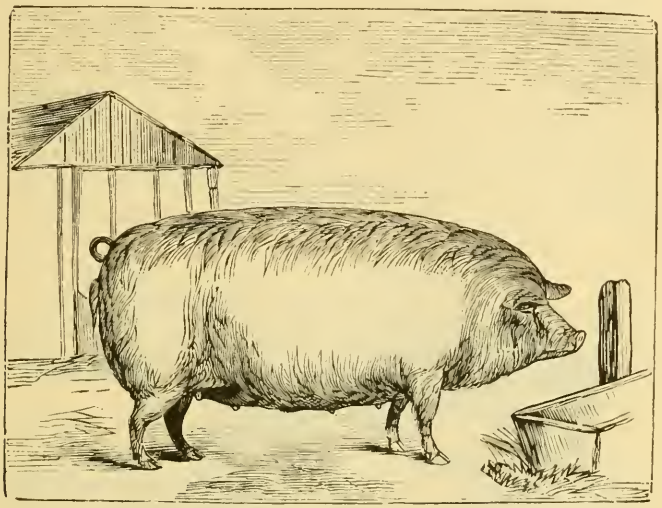
A Cross Barn.

If a large number of hogs are to be kept it is better that there be a central building twenty-five feet square, sixteen feet of which is to be used as a room for the boiler and for storing and preparing the food. Extensions from this on every side are to be built twenty-five feet wide, and as long as necessary to accommodate any required number of hogs. A tight box on four small iron wheels arranged so it will turn short corners will carry the food to every pen, which should of course be provided with a good trough, into which the feed may be easily poured. This with extensions, each forty feet long and twenty-five feet wide, will give you a cross barn, good for from 150 to 160 full grown hogs; and these extensions may be carried out to accommodate 500, if necessary, but if more than 100 hogs are to be kept the central building should be forty feet square, three stories high, the upper stories used as a granary with corn cribs next the outside. Twenty feet square should be given up for the storage and stove room below, and the breeding pens placed next on account of the greater warmth. In a building of this description near Chicago, we for years kept and fed, in connection with a large market garden, from 400 to 500 annually, the principal food used being the daily waste from large hotel kitchens, which we daily supplied with vegetables, the garden furnishing economically the necessary green vegetable food. We had no sickness or difficulty worth mentioning. The water supply was ample and pure; the pens were daily cleaned and washed in warm weather; the drainage was carefully attended to; salt and bituminous coal was supplied, so the hogs could take either at will, and we always had fat hogs to supply city butchers, and the pigs were turned off at about eight or nine months old, weighing from 250 to 300 pounds each. This was about fifteen years ago, and the breeds then kept were Chester county sows, crossed with Yorkshire or Suffolk boars.

A Simple Pen.

When swine are only to be kept in pens during the period of final fattening, and are allowed to run at large in the fields in the Summer, a pen fourteen feet wide, and of sufficient length to accommodate the number of hogs kept, will suffice. It should be floored tight, and one-half of the width allowed for sleeping. These must be closed in and roofed, the feeding pen being open to the weather, the whole being divided into compartments or spaces, eight feet one way, or wide enough for four hogs to feed abreast. This also is a good form when not more than a dozen hogs are to be kept.

Still another plan is to select a yard, in a dry, well drained place, allowing twenty feet square for each ten hogs; thus a lot forty feet square would accomodate twenty hogs. Along the middle of the pen, a

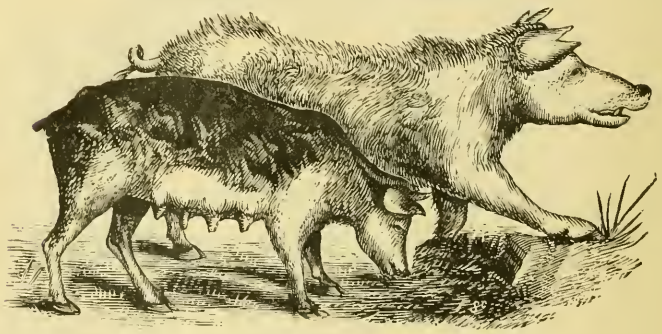


BREEDER IN GOOD FLESH.

bedding place is built, sixteen feet wide, with a partition in the middle, and divided the other way every twenty feet by partitions. The feeding place should be floored, eight feet wide, and have a low trough two feet wide, along the side for holding ear corn. Unless the season is very wet and muddy, hogs do very well thus kept. If wet, they must be kept out of the mud by means of hay and litter thrown into the yards from time to time, and the sleeping places must be kept well bedded. Kept in either of the ways we have designated, your hogs will go to the butcher fat, and showing a profit on the right side of the ledger, and your breeding sows will look like the illustration of a well-bred animal, which we give in ordinarily good breeding flesh, on this page. If on the other hand, you let your hogs shift for themselves, running wild over the prairie, or running about in the woods, they will, as the illustration on next page shows, come out pretty much like "Arkansas tooth-picks."

Summary.

In what we have said in relation to feeding in close pens, we are not to be understood as advising the practice on the farm. There should be plenty of pasture in Summer, and plenty of pure water always. Without this no one can succeed. There must be protection from insects and heat in Summer. The first may be perfectly secured by providing a dark place to which the hogs can retire at will. In Winter there must be warm, dry and otherwise comfortable shelter provided, and there must also be plenty of good food, at all times. Of all animals the hog, at least, must not be allowed to lose flesh from the time it is born until it is killed. When fat, kill at once, unless the market happens so that it will pay to hold for a short time for a turn. As a hog becomes fat, it eats



"ARKANSAS TOOTH-PICKS."

less and less, and it also fattens more and more slowly. Nevertheless, the same daily animal waste goes on. Many good feeders are so particular that they weigh their hogs every two weeks, and note the gain. Then they are able to determine just how much their stock is improving, and also as to the proper time for turning them off. If not ready, or the season and prices are not right, they increase the condition of the food given, so that the small quantity taken shall make up in richness what it lacks in quantity. This class seldom sell stock over twelve months old, and many of our best feeders sell their hogs at ten months old, which will turn the scales at from three hundred to four hundred pounds each. Such feeders never keep hogs two Summers and one Winter, in order to get an average of two hundred pounds each.

Light vs. Heavy Hogs.

Years ago, when lard and side pork were the principal hog products looked for, the heavier the hog, the better the price. We once sold a hog weighing 650 pounds for fifteen cents a pound. That was in war-times, and it brought one cent per pound over the price paid for light and well fattened hogs. The same animal to-day, would not bring within a cent a pound, of what nice young nine and ten months, well fattened pigs would, in any of our principal markets. To get the weight named, the hog was fed two years and a half. Take three pigs against this one. The difference in the first cost of the three sucklings as against the one, would not exceed three dollars. The three pigs will be fed nine months, and weigh 600 pounds,—(we have made pigs farrowed in March and killed the next January, weigh *dressed*, up to 380 pounds, and have more than once turned off such pigs at ten months old weighing alive over 300 pounds average) the other must be fed almost three years, and you must be a good feeder if you make him weigh 600 pounds. In the first case, you have fed nine months each, or twenty-seven months on the three pigs for 600 pounds, and in the other case, you have fed thirty-six months for the same weight. The one big hog has eaten more corn than the three pigs, and yet the three pigs weighing the same as the one will bring about six dollars more, giving you three dollars on the original purchase, as between the three and one, and a very considerable amount of corn on the credit side of your account book. You don't believe it? Examine the tables we have given on feeding and turning off cattle young, as against feeding until they were mature. We could show many instances fully as convincing as this, in the case of hogs; but why pile up testimony after the argument is conclusively established beyond controversy.

PART VIII.

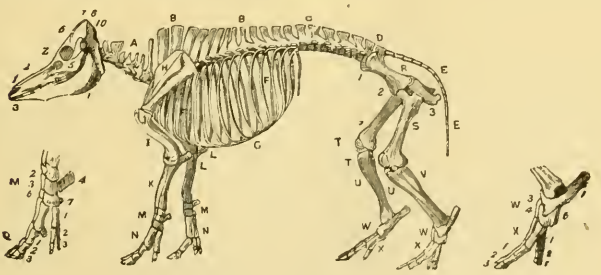
DISEASES OF SWINE.

CAUSES, SYMPTOMS AND CURE.

CHAPTER I.

DISEASES OF SWINE.

EXPLANATION OF CUT. —— DIFFICULTY IN ADMINISTERING MEDICINE. —— GOOD NURSING THE ESSENTIAL. ——MALIGNANT AND CONTAGIOUS DISEASES.——MALIGNANT EPIZOOTIC CATARRH ——HOW TO KNOW IT. —— WHAT TO DO. —— INTESTINAL "HOG CHOLERA."—— HOW TO KNOW IT.——CAUSES. —— TREATMENT. —— PREVENTION. —— CONTAGIOUS PNEUMO-ENTERITIS. —— ITS ORIGIN. ——THE ERYSIPELATOUS FORM. ——THE FORM MALIGNANT SORE THROAT.—— WHAT TO DO.——MALIGNANT ANTHRAX, SPLENIC FEVER.——TRUE CHARBON. ——CONTAGIOUS PNEUMO-ENTERITIS. —— INFLAMMATORY DISEASES. —— QUINSEY, OR STRANGLES.——RISING OF THE LIGHTS.——PNEUMONIA.——CATARRH IN THE HEAD. ——DISEASE OF THE SKIN.——MEASLES.——HOW TO KNOW IT. ——THE LARD WORM.——WHAT TO DO. —— TRICHINA SPIRALIS.——HOW TO CURE.——LICE.——DIARRHEA.——SUMMARY.



SKELETON OF THE HOG.

Explanation—*A*—Cervical vertebræ. *B*, *B*—Dorsal vertebræ. *C*—Lumbar vertebræ. *D*—Sacrum. *E*, *E*—Coccygeal bones. *F*, *F*—Ribs. *G*—Costal cartilages. *H*—Scapula. *I*—Humerus. *K*, *K*—Radius. *L*—Ulna. *M*—Carpus, or knee. 1. Scaphoid. 2. Semilunar. 3. Cuneiform. 4. Trapezium. 5. Trapezoid. 6. Os magnum. 7. Unciform. 8. Pisiform. *N*, *N*—Large meta-

carpal, or cannon. *O*—Small metacarpal. *P*, *P*—Sesamoid bones. *Q*, *Q*—Phalanges. 1. Os suffraginis, or pastern bone. 2. Os coronal. 3. Os pedis. *R*—Pelvis. (Fore-leg of pig. Phalanges 1, 2, 3). 1. Ileum. 2. Pubis. 3. Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hock. 1. Os calcis. 2. Astragalus. 3. Cuneiform magnum. 4. Cuneiform medium. 5. Cuneiform parvum. 6. Cuboid. 3, 6. Cubo cuneiform. *X*—Large metatarsal (Hind-leg of pig. Phalanges 1, 2, 3). *Y*—Small metatarsal. *Z*—Head. 1. Inferior maxilla. 2. Superior maxilla. 3. Anterior maxilla. 4. Nasal bone. 5 Molar. 6. Frontal. 7. Parietal. 8. Occipital. 9. Lachrymal. 10. Squamous-tempoid. 11. Petrous-tempoid.

Difficulty in Administering Medicine.

No class of farm animals are so difficult to treat in sickness as swine. The horse, the cow, and the sheep, may have medicine administered to them by an intelligent operator with comparatively little difficulty. Not so swine. They resist every effort with their utmost strength, and medicine can only be forced down by main strength, the resistance itself, being, in nine cases out of ten more injurious, than the good the medicine may do. When it must be administered by the mouth, the best means we have ever found, is to place the hog in a narrow pen in which he can not turn round, put a slip noose around the upper jaw, turn the medicine —in the case of a drench—down from a horn, or when it may be admissible give it in the form of an injection. In the case of boluses they may be laid on the back of the tongue, next the palate, and the animal thus made to swallow.

Good Nursing the Essential.

For the reason that medicine is so difficult to administer, it is always best, when the hog will eat or drink to disguise the dose in some food or drink it likes. In fact our practice has always been, if medicine could not be so administered, to let good nursing and care be the chief dependence in bringing the animal safely through.

In the case of those malignant forms of epidemic and contagious diseases which, under the common name of hog cholera, have so frequently scourged the West within the last few years, unless the affected animals are treated during the first or symptomatic stage, the only course to pursue is to isolate every diseased animal from the herd as soon as found, and remove the well animals to a separate place where they are not in danger, and above all where they cannot come in contact with other hogs: then with such medicine as they will eat in food or drink trust to nature and good care to bring them safely through.

So far there has been but little success attending the treatment of these diseases, probably from the fact that the incubative stage of the disease was passed and the animals beyond the reach of remedial means before the owners were aware that the animals were attacked. In the treatment of the diseases of swine, we shall first describe fully the three principal forms of those malignant diseases termed hog cholera, and for which there are so many specifics advertised—some of them by men so ignorant as to call all distempers hog cholera, and prescribe identical treatment for diseases that require entirely different remedies.

Malignant and Contagious Diseases.

There are three principal forms of malignant diseases, called hog cholera. The first is malignant epizootic catarrh, which in 1875 and 1876 swept over Illinois, Missouri, and neighboring States, destroying vast numbers of swine; next the disease noticed by Professor Kline, of England, and described as contagious pneumo-enteritis; the third, anthrax and splenic fever and a form of intestinal fever closely allied to the last if not identical, and which Dr. Law designates as intestinal fever or hog cholera.

Malignant Epizootic Catarrh.

This disease, if it does not originate in filthy yards and putrid pens, is amazingly developed there. The poison germs find a congenial home in the mucous membrane of such hogs, and in those whose skins are so dirty that the natural perspiratory acts cannot take place, so if perspiration be checked during the prevalence of this epidemic, or the swine be exposed to sudden changes or the chilly night air, it will surely predispose them to attacks.

How to Know It.

There is a short, hoarse cough, difficulty of breathing, with panting of the flanks. The head is held in a stretched and drooping position; there is fever, a stiff, tottering gait, sometimes running at the nose, often efforts to vomit, generally constipation, but at times diarrhœa. In this form the disease is shown in the dead animal by inflammation of the lining membrane of the nose and upper part of the throat, thence to the windpipe and lungs, which are more or less solidified.

A second form of this disease has a short cough, not so pronounced as in the first form, and there is less oppression in breathing; but there is more decided paralysis in the hind quarters and the gait is more tottering. There is at first constipation, followed by a profuse and fetid diarrhea.

The disease is spending itself in the stomach and bowels. The animal arching its back and especially the loins from the intensity of the pain. The brain is often affected so there is partial or total blindness and aimless movements. So also the glands will be enlarged and sometimes scrofulous ulcers will show in different parts of the body. The dead animal shows the lining membrane of the intestines inflamed and degenerated. The spleen enlarged, dark, and soft; the liver diseased, and often water exudations in the chest and belly. The duration in either form is from five to fifteen days.

What to Do.

If the disease has progressed so as to show the latter symptoms we have described, kill, and bury the animal at once, and deeply. In any event separate the animals showing the slightest symptoms from the rest of the herd, and remove the well ones to comfortable and dry and well ventilated quarters, and give pure water and good, easily digested food. As soon as the first symptoms are discovered give an emetic as follows:

No. 1. 15 to 20 Grains powdered white hellebore,
½ Pint milk.

Mix for a full-grown hog, and let it drink; if it will not, turn it down with a horn as previously described. This having vomited the hog, in a couple of hours after give two or three grains of tartar emetic, if the trouble is in the lungs; if in the bowels, two or three grains of calomel; either medicine to be given in the half of a roasted potato or apple if the animal will eat, or to be enveloped in tallow or lard and laid on the root of the tongue and the animal made to swallow. Repeat the dose twice a day until relief is obtained. According as the lungs or bowels are affected apply to the sore place the following blistering ointment, heating over a moderate fire, for half an hour and stirring to mix:

No. 2. 1 Oz. powdered cantharides,
4 Oz. olive oil.

Rub in well and repeat the application if no blister is drawn. If the animal improves, give every day for a few days the following:

No. 3. 20 Grains sulphate of iron,
30 Grains carbonate of potash.

This, when the lungs have been the seat of disease; if in the bowels, omit the carbonate of potash. Professor Townsend thinks that in many cases the liver is torpid, and thus blood poisoning takes place. When

the attack commences with copious and dark discharges from the bowels, he recommends to give at once:

No. 4. 20 Grains podophyllin.
2 Drachms bicarbonate of soda.

Or, if constipation be present:

No. 5. 1 Ounce castor oil,
1 Drachm oil of turpentine.
Both to be given in a pint of milk or gruel.

Intestinal "Hog Cholera."

In relation to this disease, undoubtedly analogous to the one last described, Dr. James Law thinks it is a specific contagious fever of swine, attended by congestion, exudation, blood extravasation, and ulceration of the membrane of the stomach and bowels. That is, fetid diarrhœa, general heat and redness of the surface, and on the skin and mucous membrane spots and patches of a scarlet, purple or black color. It is fatal in from one to six days, or ends in a tedious, uncertain recovery.

How to Know It.

Incubation ranges from a week to a fortnight in cold weather, to three days in warm. It is followed by shivering, dullness, prostration, hiding under the litter, unwillingness to rise, hot, dry snout, sunken eyes, unsteady gait behind, impaired or lost appetite, ardent thirst, increased temperature (103 degrees to 105 degrees F.), and pulse. With the occurrence of heat and soreness of the skin, it is suffused with red patches and black spots, the former disappearing on pressure, the latter not. The tongue is thickly furred, the pulse small, weak and rapid, the breathing accelerated and a hard, dry cough is frequent. Sickness and vomiting may be present, the animal grunts or screams if the belly is handled, the bowels may be costive throughout, but more commonly they become relaxed about the third day and an exhausting fœtid diarrhœa ensues. Lymph and blood may pass with the dung. Before death the patient loses control of the hind limbs, and is often sunk in complete stupor, with muscular trembling, jerking, and involuntary motions of the bowels.

Causes.

It is mainly propagated by contagion, though faults in diet and management serve to develop it. The infection is virulent, and may, it

is supposed, be communicated by the wind, and is with difficulty destroyed in hog-pens, fodder, bedding and other articles of contact.

What to Do.

Treatment should not be permissible, unless in a constantly disinfected atmosphere. Feed barley or rye, or in case these raise the fever, corn starch made with boiling water; give to drink fresh cool water, slightly acidulated with sulphuric acid. For the early constipation give a mild laxative (castor oil, rhubarb), and injections of warm water, to be followed up with nitrate of potassa and bisulphate of soda, of each 20 grains at a dose. If the patient survives the first few days and shows signs of ulceration of the bowels, by bloody dung, or tenderness of the belly, give oil of turpentine fifteen to twenty drops night and morning. Follow up with tonics and careful, soft feeding.

Prevention.

Kill and bury the diseased; thoroughly disinfect all they have come in contact with; watch the survivors for the first sign of illness, test all suspicious subjects by means of a clinical thermometer introduced in the rectum, and separate from the herd if it shows 103 or more degrees Faranheit. And as soon as distinct signs of the disease are shown *kill and bury deep.* Feed vegetable or animal charcoal, bisulphate of soda, carbolic acid or sulphate of iron to the healthy swine, and avoid all suspected food or places, or even water which has run near a diseased herd. All newly purchased pigs should be placed at a safe distance in quarantine, under separate attendants, until their health has been surely established as sound.

Contagious Pneumo-enteritis.

This disease known commonly also as "hog cholera," "purple," "blue disease," etc., is a contagious inflammation of the lungs and bowels, accompanied with red and purple blotches of the skin, the last described being one of relative forms of this disease.

Its Origin.

It is supposed to be caused by extremes of temperature and wet seasons, feeding on low or swampy soils, impure water, filthy feeding pens. Whether these causes originate the disease or not they incline the system to infections from the subtle poison which Dr. Klein, an eminent English

veterinarian, has proved to be due to a minute vegetable organism, (*bacillus*) found in the serous fluids, and tissues of animals infected. M. Roche Lubin, a French veterinary authority says the disease will disappear if proper sanitary means are used, protection from the sun and rain, well ventilated quarters, and clean bedding, often renewed, with pure water and wholesome food. We have been thus particular in quoting, to intensify what we have repeatedly said, cleanliness and care.

How to Know It.

There are two principal symptomatic forms which are important to be noticed, as follows:

The Erysipelatous Form.

The animal at first is dull, loses his appetite, lies down and moves unwillingly. He hangs his head, and sometimes makes efforts to vomit. The bowels at this time are generally constipated, the excrement being hard and dark colored; cough and difficult urination.

The next day or in a few hours, even, the characteristic symptom of the disease shows itself. This consists in the appearance of dark red or purple blotches, passing into a bluish-black color. Once seen, they cannot be mistaken. Their most frequent seats are the ears, throat, neck, breast and inside the fore legs. If he is a white hog the discolorations are very visible. With these there is often a discharge from the nose of a dark purple fluid. Soon his breathing becomes panting and labored; he is palsied in his hind quarters, and if he is driven up runs reeling with his hind legs and his head dropped to the ground. At this stage a fetid diarrhœa sometimes sets in. The fatal termination is reached in one or three days.

The Form with Malignant Sore Throat.

The general symptoms at the commencement are the same; and the appearance of the throat has that same deep red, passing into dark purple hue, which we have just noticed in the erysipelatous variety. But the obstructions to the functions of breathing and swallowing naturally produce a train of characteristic symptoms not seen in the former case. There are attempts to vomit, difficulty in swallowing, and labored breathing from the first, the sensation of choking being so distressing that the animal will sit on its haunches, like a dog, gasping for breath, opening its mouth wide, and protruding a livid and swollen tongue. Sometimes the swelling about the larynx is so sudden and considerable that the ani-

mal is choked to death in less than an hour, and before hardly any other symptom has had time to manifest itself (œdema of the larynx).

What to Do.

The cheapest remedy with animals distinctly attacked, is to kill at once, and bury deeply out of sight, to prevent contagion. If the animals are valuable, isolate them from all danger of spreading the contagion; give two to three ounces of castor oil, and as soon as it operates, give twenty grains of nitrate of potash, and twenty grains nitrate of soda,—mixed for a dose—two or three times a day. Give also powdered charcoal in the drink, and if the bowels are swollen and tender give twenty drops of turpentine in a little gruel, as may be needed. The prescription of M. Lubin, and one of the most valuable known is:

No. 6. 10 Grains powdered camphor,
1 Drachm nitrate of potash,
5 Grains calomel.

Mix and give in a little gruel three times a day, omitting the calomel after the third dose.

The local treatment should be attended to. Foment the swollen part with hot water saturated with copperas (sulphate of iron). If there is gangrene, saturate the surrounding tissues with turpentine and sweet oil, and attend strictly to the general sanitary conditions of the hospital or place where the animals, both sick and well are kept. Professor Williams advises the use of chlorate of potash as superior to all other medicines. His prescription is:

No. 7. 2 Drachms chlorate of potash,
½ Pint water.

Professor Turner, the well known Illinois scientist and extensive farmer, advises the following as having been successful with him as a preventive, and if taken in the early stages of the diarrhœa, as a cure:

No. 8. 2 Lbs. flowers of sulphur,
2 Lbs. sulphate of iron,
2 Lbs. madder,
½ Lb. black antimony,
½ Lb. nitrate of potash,
2 Oz. arsenic.

Mix with twelve gallons of slop, and give a pint to each hog; this quantity being for 100 hogs.

Our best word of advice is, if the affected hogs cannot be made to take the remedies in their food or drink, since it is a question of profit and

loss simply, then kill, bury at once, and disinfect promptly. For the means of disinfecting, see chapters on contagious diseases in cattle. If we had simply said kill and bury, our readers would not have been satisfied. Thus we have given much point to remedies; yet it will again bear repeating: In all contagious diseases of animals, of a malignant type, it is cheapest and most humane to KILL AND BURY QUICKLY AND DEEPLY. We have never found any remedy effective once it assumes a malignant form. Unfortunately, there are too many careless or pennywise persons who will not kill, and who constantly spread contagious diseases.

Charbon, Malignant Anthrax. In Swine, Splenic Fever.

It has been denied that this disease attacks swine. Since it is a blood poison known to attack various animals, and which may be communicated to man, there seems to be no good foundation for the assertion. In this country there has not been sufficient systematic investigation to separate the names of the true Anthrax from what is popularly known as hog cholera. The distinction between Anthrax (Charbon) and contagious pneumo-enteritis is stated explicitly by Dr. Klein as follows:

TRUE CHARBON.	CONTAGIOUS PNEUMO-ENTERITIS.
Period of incubation, or latency, from a few hours to three days.	Period of incubation from two to five days and more.
Easily transmissible to other species of animals.	Rarely and with difficulty transmitted to other species.
Spleen always enlarged, and often broken down.	Spleen rarely enlarged or otherwise changed.
Blood after death dark and fluid.	Blood after death of ordinary appearance.
Bacillus anthracis in the blood.	No *bacillus anthracis* in the blood, but numberless bacilly in the serum of the throax and abdomen.
Lungs and bowels frequently not implicated. Cough may be present.	Lungs and bowels *always both* inflamed. Cough always present.
The discoloration local, and of a true carbuncular appearance.	The red or purple color diffused over the surface, and of an erysipelatous appearance.

The most common form of anthrax in pigs is popularly called "white bristle." There is a carbuncular swelling, usually on the throat, presenting the features of color already described. The bristles on the spot turn white and brittle, whence the name just given. The swelling extends

inward, involving the windpipe and gullet, causing difficulty of breathing and swallowing, and at length death in convulsions through suffocation. Occasionally the true apoplectic or splenic form of charbon appears, and also the variety which attacks the tongue and mouth, both acute and quickly fatal, the apoplectic form often killing almost instantly. The flesh of all animals dying of any form of this disease, as previously stated, is poisonous, and the blood and discharges capable not only of spreading the disease among others of the same species, but also, if inoculated into the human system, of bringing on that mortal malady, "malignant pustule." The treatment, if treatment for so fearful and fatal a disease may be allowed, should be essentially the same as that prescribed in contagious pneumo-enteritis. As a preventive the recipe of Prof. Turner may be used. We advise to give medicine if only early symptoms be observed, but if animals be distinctly attacked to *kill immediately, bury out of sight, and* DISINFECT THOROUGHLY.

Inflammatory Diseases.

Swine are from their nature, and the usual manner in which they are kept, quite subject to coughs, colds, quinsy, and inflammatory diseases, especially of the lungs.

Quinsy, or Strangles.

This is a disease quite common and fatal. It is an inflammation of the glands of the throat, (tonsils) and often kills quickly through suffocation. If in feeding them there be found difficulty in swallowing, or protrusion of the tongue, and slavering from the mouth, and if there be a swelling under the neck and lower jaw, lose no time, cast the pig so he may be held firmly, and with a lancet or sharp knife, scarifying the skin of the throat deep enough to draw blood freely. Foment the parts with cloths wet with hot water and partially wrung out, repeatedly applied to induce bleeding, and reduce the inflammation, while an assistant prepares the following injection:

No. 9.
4 Oz. sulphate of magnesia,
2 Drachms oil of turpentine,
½ Pint soap suds.
Mix.

With a feather fastened to a small rod, the hog's mouth being held open, swab the tonsils and inside of the throat as far as can be reached, with equal parts of lard oil and turpentine, or if the hog will eat, give doses of two tea-spoonfuls each in a pint of gruel.

Rising of the Lights.

This is the name applied to an ordinary cold. To cure this, keep the animal warm, feed well, and rub mustard, moistened with vinegar, on the throat and chest. If it does not yield, give an ounce of tar daily, by putting a slip noose over the snout, opening the mouth, and placing the tar well back on the tongue with a narrow wooden paddle.

Pneumonia.

The symptoms of inflammation of the lungs are, quick and laborious breathing, loss of appetite, shivering of body and limbs, more or less severe cough; and the animal will not eat. The remedy is to keep the animal thoroughly warm and quiet. Rub the preparation of mustard and vinegar on the chest, and give internally,

No. 10. 2 Drachms nitrate of potash,
2 Drachms bisulphate of soda

Mix in a pint of gruel if the animal will eat. If not turn down from a horn.

Catarrh in the Head,

Commonly called snuffles. Give the animal a clean, dry, warm pen, and feed and water well; soft food being preferable.

Disease of the Skin.

Swine are essentially liable to diseases of the skin, when kept in confinement, unless pains be taken to do for them what they cannot do for themselves, except where they have their liberty.

Measles.

Measles in swine have nothing in common with the disease of the same name in the human subject. The name is given to a parasitic affection, occasioned by the hog taking the eggs of the tapeworm, either in grazing, where they have been dropped with the excrement of the dog, or from feeding on pastures manured with human excrement. These eggs hatch and work their way into the tissues and become encysted, and if the pork of such animals is eaten, insufficiently cooked to destroy them, by man, they transfer the tapeworm. In fact, it is not certain that ordinary cooking does destroy all, therefore it is never safe to eat measly pork. The appearance of the pork is owing to the presence of minute cysts, the size of grains of barley, distributed through the muscular and other tissues.

How to Know It.

There may or may not be, but generally is, a discharge from the nose, running of the eyes, weakness of the hind parts, and general ill health. By examining the skin, small watery pimples will be found of a pink or red color. The remedy is undoubtedly beyond the reach of medicine, though a so-called specific is small doses of sulphur and saltpetre, given daily for weeks. The prevention is, to put no human excrement on grazing fields, to keep dogs clear of tapeworm by an occasional vermifuge, to bury all excrement of dogs found in the pastures, and to kill all stray and worthless curs.

The Lard Worm.

There is another parasite of the hog, the lard worm (*Stephanarus Dentatus*), from one to one and three-quarters of an inch long, which is occasionally found in all parts of the body; of swine is frequent in the liver, kidneys and fat around the ribs, and in various organs of the body, including the heart. When present in large numbers, especially in the kidneys, its eggs may sometimes be discovered in the urine, by means of the microscope. Another worm, *Eustrongylus Gigas*, also inhabits the kidneys; both may produce weakness of the back, but it would not be safe to treat for these parasites, unless this was surely determiued by the microscope.

What to Do.

Do nothing. Various remedies have been prescribed, such as small doses of sulphur and salt, given daily for several weeks, or small doses of salt and turpentine. Neither have certainly been known to do any good. Minute doses of arsenic, *one-eighth of a grain*, given daily for two or three weeks, so it may be taken up by the system, would be the proper course indicated. The better way is to prevent their getting measly, by keeping the diseased ones entirely from the well ones, and the young away from the old.

Trichina Spiralis.

This minute parasite is capable of infesting all domestic animals, including man. The mature and fertile worm lives in the intestines of the animals, and the immature worm in cysts in the muscle. The eating of rats, and other vermin, and slaughter house offal is the prolific source from whence they come. The prevention is obvious. They are rarely found in western farm-raised, corn-fed hogs. There is no danger from eating pork infected with trichina, if it be *thoroughly cooked*. There is

no means of discovering them in flesh, except by the microscope. Eat none but corn-fed pork, and that cooked done. Rare cooked pork in any form whatever, is an abomination, and pork fed in slaughter house yards and distilleries should warrant their owners being sent to the penitentiary.

Mange, or Scab.

This is caused by the presence of a minute insect, *sarcoptes suis*, transmissible to man, and should not be allowed in any herd of swine.

What to Do.

As soon as discovered, rub the infested animals thoroughly with soft soap, let it remain an hour, and wash off with warm water using a good brush, let the animals dry, and apply the following ointment:

No 11. 1 Pint train oil,
2 Drachms oil of tar,
1 Drachm petroleum.

Mix with sufficient flower of sulphur to make a thick paste. This should be well rubbed in, and remain on three days. Then wash thoroughly with strong soap suds, dry, and change to quarters perfectly clean, burn all bedding, and cleanse the quarters thoroughly with carbolic acid and water. The carbolic liquor of gas works is good, of which there should always be a barrel on the farm. It is cheap. Thin down slaked lime with it, and thoroughly paint all infected places.

Lice.

If lice are found on swine, it is a sign that something is wrong. We have never seen them on well conditioned swine. When they occur from any cause, sponge the animal freely with crude petroleum, or kerosene, and give a little sulphate of iron, (copperas) one quarter drachm a day, in the feed. Let the food also be ample and nourishing. Another efficient and safe remedy for killing lice is Scotch snuff, rubbed up with lard, and applied where the lice are found.

Diarrhea.

Diarrheal affections often attack young pigs during their sucking season, generally in the first week of their life — and often causes their death. Usually the cause is due to diseased milk of the sow, either from bad food, or other causes. If so, change the food. In any case, the remedial means must be used with the sow. Place charcoal and salt where sow and pigs may get it, and prepare the following powder:

No. 12.

2 Pounds fenugreek, powdered,
2 Pounds anise seed, powdered,
1 Pound gentian, powdered,
2 Ounces carbonate of soda,
2 Pounds chalk, powdered.

Give a table-spoonful of this in the food, every time the sow is fed.

Summary.

From what we have said the reader will easily perceive that we have not much faith in remedial means in contagious diseases of swine. The same holds good with any animal when once the disease is pronounced, and of a malignant type—unless the animal be so valuable that it will pay to call a veterinary surgeon. Even then in the malignant forms of the diseases described, and which are known under the popular misnomer of "Hog Cholera," killing and burying is the cheapest and altogether the most humane. The danger of spreading: the difficulty of isolation; and the next to impossibility of treating a hog too sick to eat, but never too sick to be contrary, or resist to the full extent of their power, and the ordinarily small cost of swine per head should be well considered in the treatment of swine. Use proper discretion in treating them, but do not hesitate a moment in killing, when the disease is malignant, and in ordinary cases remember that if the hog will not take his physic kindly in his gruel, better let nature and good nursing perfect the cure than to violently force medicine down. Please remember the value of good nursing in human patients. To reinforce this we may state the fact that in France, long continued experiments in hospitals, with many patients, treated under the various systems of medicine, a greater proportion recovered with *no medicine and good care and nursing*, than did under MEDICATION WITH ORDINARY HOSPITAL CARE AND NURSING. This may not have been complimentary to the hospital management, yet in no country in the world are they better or more conscientiously managed.

The necessity of good nursing in the case of swine is no less imperative than in that of human beings, and its good results are as manifest.

PART IX.

POULTRY.

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

POULTRY.

CHAPTER I.

HISTORY AND WILD TYPES.

CREVE COEUR COCK AND HEN.

Origin of Domestic Fowls.

The first domestication of the farm yard fowl is lost in the obscurity of the past. We have not even tradition to guide us. There is a legend

MEXICAN WILD TURKEY.

that Gomer, the son of Japhet, took his name from the cock, and hence it has been inferred that he was the first to domesticate the species. As well might some future historian attribute the domestication of various

EMBDEN, OR BREMEN GEESE.

wild and domestic animals of our time to the savage Indian, whose fancy leads him to accept the name of various wild beasts and birds as his own.

The fact is, the domestication of wild fowls is exceedingly easy, as has been proved within the last three hundred years by the domestication of the wild turkey of America, (*meleagris*) of which there are but two species known, M. Occellata, a native of Mexico and Honduras, and M. Gallopavo, from which our common domestic varieties have descended. Later the American wild goose, (*anser canadensis*), a distinct species from the gray legged goose of the North of Europe, and the supposed ancestor of the common white or gray goose, and the Embden or Bremen goose.

Besides Europe and America, Asia and Africa have furnished us with four sub-varieties of geese, three of which are called China geese, the fourth being the African or Hong Kong variety.

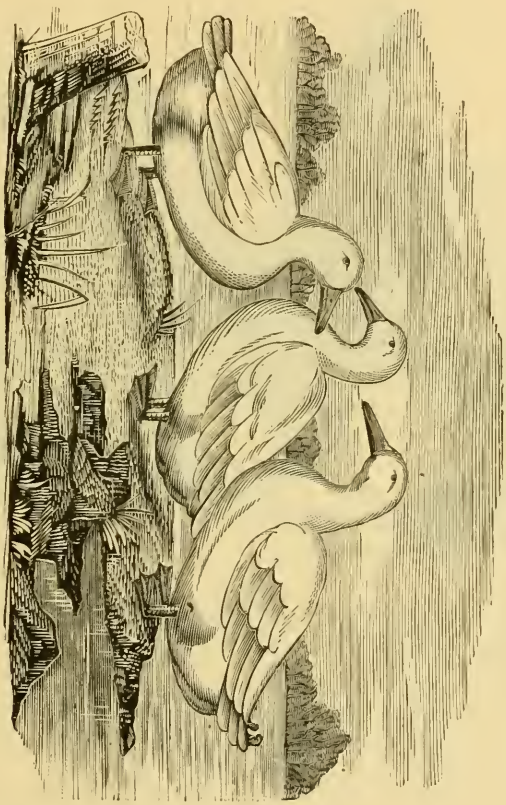
Africa has also furnished us with the Guinea fowl,(*Numidia meleagris*) called Pintado by the Spanish. It is a native of Northern Africa, where it is still found wild in large numbers, in some parts. The Pea fowl, (*Pavo cristatus*) has also been known from the remotest antiquity and is often used by ancient writers as an emblem of pride and arrogance, and it may be added, what is also true of the arrogant and strutting turkey, it is as cowardly as it is arrogant and cruel.

The pheasant may here be noticed as a breed long half domesticated, and yet never brought perfectly under the domestication of man. The probable reason for this is that like the Peacock, they have always been considered more ornamental than useful. There are four or five distinct and beautiful species, that as ornamental breeds in parks should be more extensively bred than they are.

The Swan is another breed long known in history and yet which cannot be considered of special value, except as ornaments in artificial lakes in the parks and grounds of the wealthy. Their dying song is often quoted from classic literature; so far no one has yet been charmed with its song in modern times, which may prove one of two conclusions, either the ancients were satisfied with a very low order of vocality, or else the modern taste for musical sounds has become too refined to appreciate the notes of the swan either in health or sickness.

The duck seems to have been one of the most easily domesticated of fowls, and if the varieties are not excessively multiplied, it is because they are not considered a delicacy, and comparatively little used as food. Nevertheless, we think them underestimated. Some varieties are very beautiful in plumage; they are handsome in the water, and their flesh is by no means to be despised. Among the most valuable varieties are the Aylesbury ducks, a prominent English breed, an illustration of which we give.

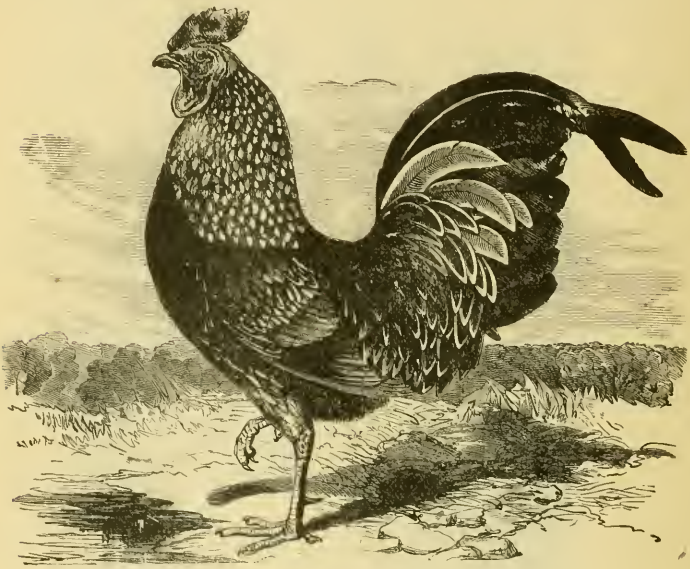
Of the progenitors of barn-yard fowls (Gallus), there are several wild species. Among these may be mentioned the Sonnerat fowl, discovered by the naturalist of that name in the Ghautes, which separates Malabar from Coramandel, a thoroughly wild species never yet tamed. Sonnerat was probably mistaken in supposing they were the primitive type of our



AYLESBURY DUCKS.

domestic tribe. Damphier had previously found wild cocks in the islands of the Indian Archipelago, that are now known to nearly approximate ours. The Bankiva species in Java, and the Kulm or gigantic cock of

Sumatra and Southern Asia—the jungle fowl of the continent of India, may also lay claim to being the progenitors of our domestic fowls, as well as the species named after the egotistic Sonnerat. In India our farm fowls are believed to have sprung from the jungle cock and wild species of Malay and Chittagoney.



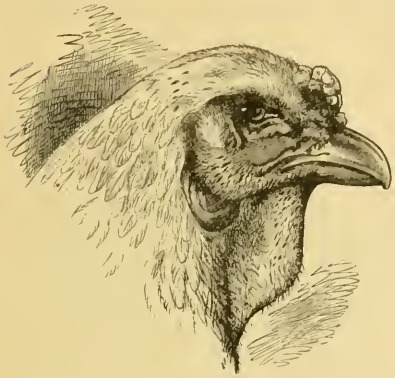
GALLUS SONNERATII.

Our Bantams are undoubtedly sprung from the Bankiva jungle fowl. Our large Asiatic from the great Malay and Chittagong races through long generations of breeding and selection in China. Whatever the races from whence they sprung, the wild types are now very scarce and difficult to find, while domestic fowls, in their almost infinite varieties, are found not only in every farm-yard and village lot, but are bred extensively and successfully in our largest cities.

But wild fowls, of the genus Gallus, are also natives of the Brazillian forests of America. Oliver de Serres writes of them as follows:

"In traveling over the gloomy and inextricable forests of Guiana, when the dawn of day began to appear, amidst the immense forests of lofty trees which fall under the stroke of time only, I often heard a crowing

similar to that of our cocks, but only weaker. The considerable distance which separated me from every inhabited place, could not allow one to think this crowing produced by domesticated birds; and the natives of those parts, who were in company with me, assured me it was the noise of wild cocks. Every one of the colony of Cayenne, who has gone very far up the country, gives the same account of these wild fowl. I have seen one myself. They have the same forms, the fleshy comb on the head, the gait of our fowls, only that they are smaller, being hardly larger than the common pigeon; their plumage is brown or rufous.



HEAD OF SINGLE WATTLED BRAHMA FOWL.

HEAD OF BREDA, OR GUELDRE.

Before this the wild fowls of America had been mentioned. The Spaniard, Acosta, provincial of the Jesuits of Peru, has positively said that fowls existed there before the arrival of his countrymen, and that they were called in the language of the country, *talpa*, and their eggs *ponto*. We are not aware that this species has ever been brought into a state of domesticity, or that the wild species has ever been taken and reared. The wilds of the great South American forests are yet as a sealed book, in many respects, to the naturalist. Under the regime of the present practical and scholarly Emperor, this, in Brazil, is being changed, and gradually this immense territory will be made to yield not only increased stores to our ornithological knowledge, but also in other departments of practical art and science.

Our domestic poultry may be divided into four groups, each of which will be separately considered.

1. Our Common Barn-yard fowls.
2. Asiatic fowls.
3. Games, including Game Bantams
4. Pet Bantams.

In the first group we shall notice English, American and continental families. In the second group all Asiatic breeds. In the third group all the more important Games, and in the fourth group all the better known small varieties of Bantams, except Games, both smooth and feathered legged.

On the preceding page we give illustrations of two curious varieties in domestic fowls, one in a sub-family of Brahmas, the other in a family of fowls of Dutch origin.

CHAPTER II.

VARIETIES OF BARN-YARD FOWLS.

I. DORKING FOWLS. — II. SILVER GREY DORKINGS. — III. BLACK DORKINGS. — IV. FAWN-COLORED DORKINGS. — V. BOLTON GREYS. — VI. DOMINIQUE FOWLS. — VII. PLYMOUTH ROCKS — VIII. THE OSTRICH FOWLS. — IX. HAMBURG FOWLS. — X. BLACK HAMBURGS. — XI. LEGHORNS. — XII. WHITE LEGHORNS. — XIII. SPANISH FOWLS. — XIV. FRENCH FOWLS. — XV. THE HOUDANS. — XVI. LA FLECHE FOWLS. — XVII. THE CREVE COEURS. — XVIII. LARGE ASIATIC BREEDS. — XIX. THE CHITTAGONGS. — XX. BUFF COCHINS. — XXI. PARTRIDGE COCHINS. — XXII. WHITE COCHINS. — XXIII. BRAHMA FOWLS. — XXIV. LIGHT BRAHMAS. — XXV. FRIZZLED FOWLS. — XXVI. SILKIES. — XXVII. BREDA, OR GUELDRE FOWLS. — XXVIII. GAME FOWLS. — 1. BROWN-BREASTED REDS. — 2. EARL DERBY GAME. — 3. DUCK-WINGED GAME. — 4. WHITE GEORGIAN GAME. — 5. GAME BANTAMS. — 6. OTHER BANTAMS. — 7. SEABRIGHT BANTAMS. — 8. JAPANESE BANTAMS.

I. Dorking Fowls.

Of distinct English breeds the Dorkings have become the most celebrated. Of these the White Dorking of Surrey is the typical fowl. It is, as compared with the so-called dung-hill fowls, large, often weighing, the mature cocks fully ten pounds, the hens eight to nine pounds, and at a year old from six to eight pounds. They are of good size, plump, compact, with strong heads, full wattled, and with single serrated comb, short necks, short white legs, with five toes, and full plump breast, the plumage pure white and without spot. They are tolerably hardy, good layers and most excellent mothers. The illustration on following page is a representative of this breed.

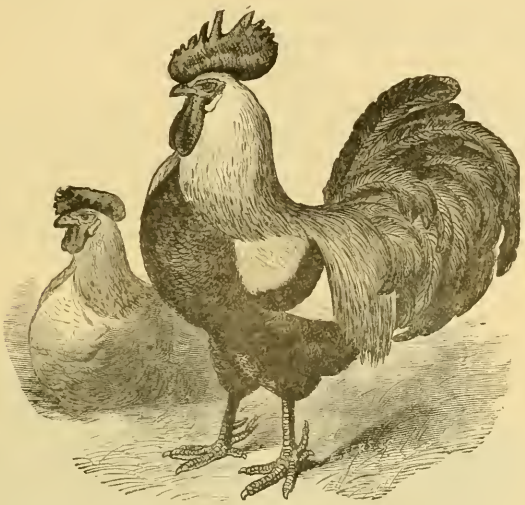
II. Silver Gray Dorking.

This variety is considered to be a sport of the White Dorking perpetuated by careful breeding and selection. With stock from families that have been carefully bred by careful selection they may be kept to the standard. But they vary much in color, the dark varieties often producing silver gray chicks.

WHITE DORKING COCK.

The Gray Dorkings are rapid growers, and if well supplied with food are in condition for the table at any age, often before they fairly get their feathers. The distinguishing colors are: breast, tail and larger tail feathers perfectly black; the head, neck, hackle, back, saddle, and wing

bow a clear, pure, silvery white, and across the wings a well defined black bar, in striking contrast with the white outside web of the quill feathers and the white hackle of the neck and saddle. The neck of the hen is



GRAY ENGLISH DORKINGS.

silvery white, the breast salmon-red, changing to gray near the thighs; the wings silvery or slate gray, and without any tinge of red whatever. The tail should be dark gray, the inside nearly black.

III. Black Dorkings.

This sub-family are jet black in color, the neck feathers of some of the cocks tinged with gold, and of the hens tinged silvery. The comb may be either rose or single but usually double, short and sometimes cupped; wattles quite small and very red near the head. The tail feathers shorter and broader than those of the white variety; the legs black, short, and with the two under toes quite distinct and separate, sometimes showing a rudimentary toe. They are hardy, the hens are good layers, good setters and careful nurses, and the eggs are of a large size.

IV. Fawn-colored Dorkings.

These are handsome birds of high carriage, said to have been produced by a cross between the White Dorking and fawn-colored Turkish fowl.

Their tails are shorter than any other variety of Dorkings and the legs black. The cocks will weigh from eight to nine pounds and the hens from six to seven. They have remarkably fine flesh and lay large eggs. In relation to the Dorkings as a class, we have found them not well adapted to stand wet, cold weather. Yet with proper care they are the best of the distinct English breeds.

V. Bolton Gray.

This breed, sometimes called Creole, used to be in good repute in England, and were bred with such nicety that individuals could scarcely be distinguished apart. They are great layers, but poor setters, and when carefully bred are one of the best breeds for the farm yard. They are a medium sized, plump, short-legged fowl; neck and body pure white thickly spotted with black, black bars at the extremity of the tail.

DOMINIQUE FOWL.

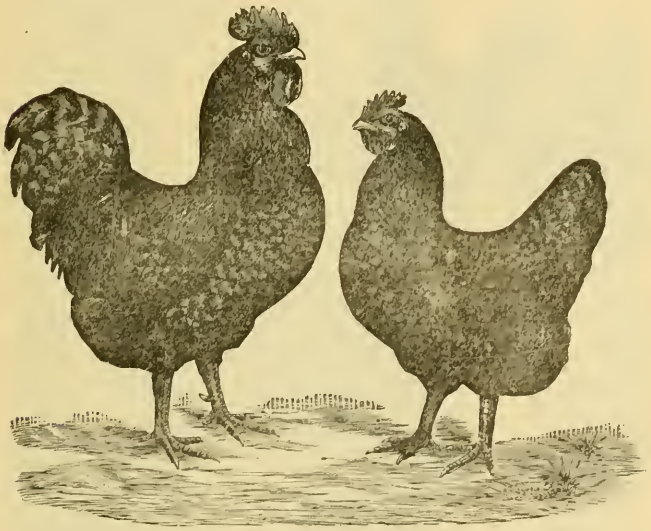
The hens are constant layers, but the eggs, although of good quality, are rather small, weighing about one and a half ounces each. They are comparatively rare in the United States.

VI. Dominique Fowls.

The Dominique, a distinctly American breed, and for the ordinary farmer, where hardiness, fecundity, good laying propensity, and excel-

lence of flesh is concerned, is one of the very best in existence. They breed constant in color, markings, constitution and vigor, and are always well able to take care of themselves.

The true color of the Dominique is a light ground undulated and penciled in the softest manner with slaty blue—almost black—forming bands all over the body. The hens and cocks are shaded alike except that the plumage of the cock is more distinct, often with golden hackles, and bronzed wings. The comb of the cock may be either single or double, but we prefer the single comb, as most indicative of the true type. The iris of the eye is a bright orange, and the bill and legs a bright yellow or buff color. They are square built, broad breasted, rather short legged fowls, with little offal, and with high flavored and profitable flesh; elegant in plumage, and a hardy, healthy, profitable and prolific race of birds.



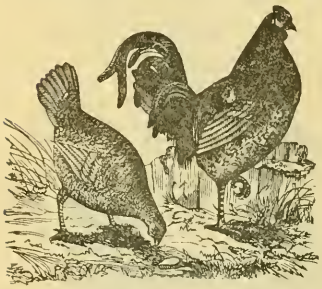
PLYMOUTH ROCKS.

VII. Plymouth Rocks.

This is a modern American breed originated by Dr. Y. C. Bennett, and first shown at Boston in 1840. Said to have been produced by a cross of a Cochin-China cock, with a hen, herself a cross between the fawn-colored

Dorking, the large Malay, and the Wild Indian fowl. Fanciers becoming interested in this breed, it was very considerably disseminated, but failed to give satisfaction on account of the want of uniformity in the chickens either in marking or form. Much bitter controversy has ensued, which shows that there were several different origins, in which the Java, Cochin, Gray Chattagongs, Dominique, Gray Dorking, and even the common dunghill fowl figured. Of late years fowls have been produced under the name of Improved Plymouth Rocks, the modern style showing excellent and uniform breeding. A fowl that grows rapidly, fledges early, making flesh fast, and which in the hands of expert fanciers, combines many of the most excellent qualities to be desired, either as layers or as table birds.

VIII. The Ostrich Fowls.



BUCKS COUNTY, (PA.) FOWLS.

This excellent breed originated in Bucks county, Pa., and were called Bucks county fowls. The cocks of this variety will average nine pounds. They are good layers, sometimes producing forty or fifty eggs before becoming broody. The eggs are large and of good flavor; the flesh white, firm, and of excellent quality. The color of the cock is a dark blue-black; the ends of the feathers tipped with white; wings a yellow or golden tinge; hackle dark, glossy blue. A double rose comb surmounts the head with large wattles beneath. The carriage is bold and alert. The hen is similarly colored, but more sober in shade, with a plump, thick body, a high serrate single comb, wattles large, and legs short and of a dark color.

IX. Hamburg Fowls.

The Hamburg fowls all have these characteristics: They have bright double combs, firmly fixed, and ending in a long point turned up behind. They are of medium size, of sprightly carriage; tails large and held upright with long plume feathers; of robust constitutions, great layers, seldom broody; in fact, almost never, when kept in confinement. The eggs are small but of excellent flavor.

X. Black Hamburgs.

This is probably the best variety of the family for farmers, and in fact one of the very best of the black fowls. Possessing the two-fold value

of being alert, noble looking, handsome fowls, color deep black with a metalic luster; hardy, robust, and the hens constant layers.

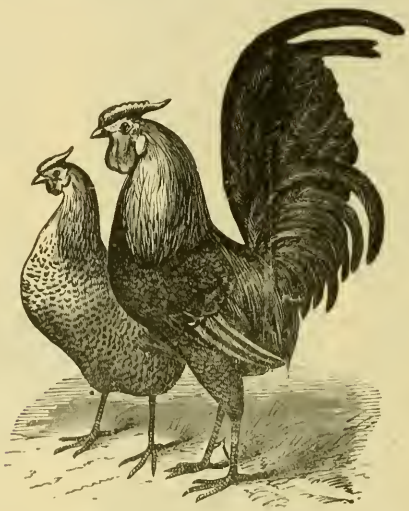
BLACK HAMBURGS.

Penciled Hamburgs.

These are of two varieties, the Silver and Golden. In the Silvered sub-family, the ground color is silver-white, sometimes with a slight yellow tinge, but every feather margined with the most glossy black. The

cocks of either variety exhibit the pencilings, as do the hens, but are white or brown in the Silvered or Golden breeds respectively.

There are few, if any, more striking fowls than these in the hands of expert and careful breeders, with their symmetrical, gay and upright carriage, their well-defined deaf ears, elegant combs and wattles, their ample, well-feathered tails, and fine-boned, taper, blue legs.



GOLDEN PENCILED HAMBURGS.

The hens of both varieties must have the body clearly and definitely penciled, and the hackles of both cocks and hens must be entirely free from dark marks. The engraving which we give fully illustrates the characteristics of the several varieties. As fancier fowls they are superb; as farm fowls delicate.

XI. Leghorns.

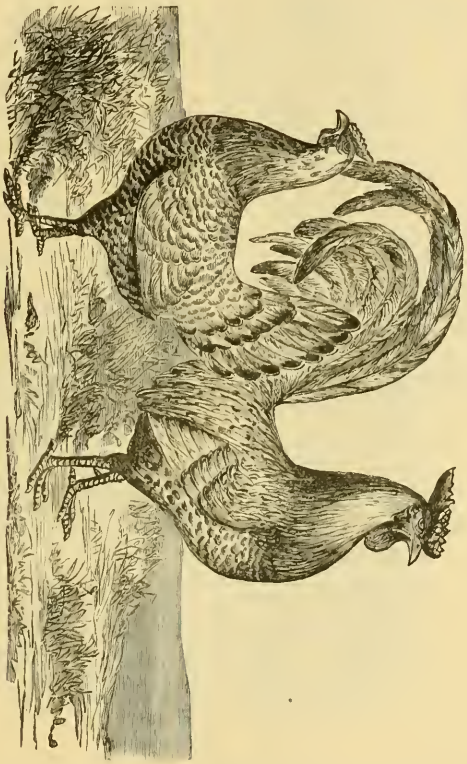
This admirable breed of European fowls has become widely disseminated in the United States, being valued for their many good qualities, among which are beauty and constant laying propensities. They are bred by fanciers of all colors from white to black.

XII. White Leghorns.

White Leghorns are, we think, the most valuable to the farmer as they

are the handsomest. The description of this variety will suffice for all, excepting color.

The Whites are in size about that of the Spanish, and like the Spanish the combs of the best hens lop over on one side. The plumage is white with hackle feathers slightly golden tinged, the rest of the feathers pure white. They are comparatively a hardy breed, standing extremes of



SILVER PENCILED HAMBURGS.

cold and sudden changes fairly, except that their immense single combs are liable to freeze in Winter. The hens are persistent layers, and especially good Winter layers, when they are kept comfortably housed, and seldom incline to set. The legs and skin are yellow. The cocks have large single perfectly erect serrate combs, the divisions being in

fact spiked. The wattles are full and large, with white or cream colored ear lobes, extending sometimes up on the face. The chicks are hardy, good foragers, feather early, and at the age of six to eight weeks are miniature fowls, showing much of the stature and grace of the mature fowl.

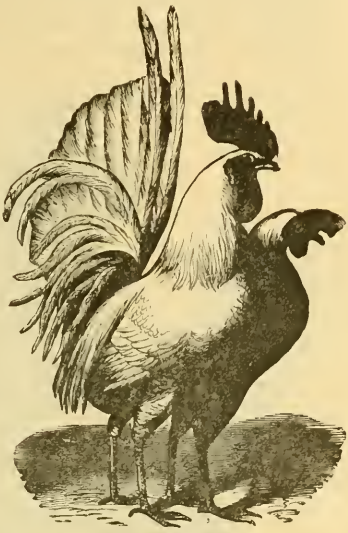
WHITE LEGHORNS.

The cut will show what would be considered prize fowls in any show ring.

XIII. Spanish Fowls.

The Spanish fowls in their several varieties have long been known and justly esteemed in the United States for their great laying and non-setting propensities. The whole race, however, are rather tender as far as cold

wet weather is concerned. But for the amateur who will give good care and attention, they will amply repay their cost in the production of plenty of large, meaty eggs. In the South they are an admirable breed. In any locality they must be allowed plenty of liberty since they soon suffer from close confinement. There are many varieties described besides the pure white and the pure black, as the red-faced black, or Minorca, the Ancona, Gray, or mottled breed, and the Blue or Andalusian. The cut which we give on the next page, of the Black Spanish and description of same, will suffice for all.



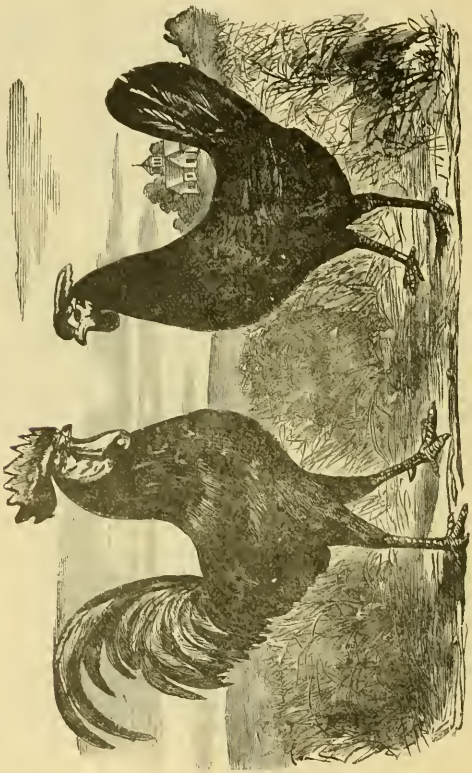
STANDARD WHITE LEGHORNS.

The cock should carry himself erect and stately, the breast projecting and the tail erect, and with sickle feathers fully developed. The plumage should be jet black, and without the least approach to white or any other colored spots, but with glossy reflections in the sunlight. The fowl plump and compact; the legs blue or dark lead color; the comb large in both sexes, bright vermilion in color, deeply serrate or rather notched like a saw; that of the cock entirely upright and without twist whatever, and extending well back of the head. The comb of the hen should fall completely over on one side; the face must be quite white and without red specks, wide and deep and extending high over the eye, arched in shape, approaching the bottom of the comb, extending sideways to the ear lobes, meeting under the throat, and in texture entirely fine and smooth. The ears must be large and pendulous, and as white as the face.

XIV. French Fowls.

There are three principal breeds of French fowls that have within the last ten years acquired an excellent reputation wherever known. They are the Houdan, Creve-Cœur—both of which are quite well disseminated—and the La Fleche. The first two breeds take their names from villages of these names, and the latter from the arrondissement of La

Fleche, in France, where they are most commonly raised. Besides these there are several other varieties of useful and ornamental breeds known in France as, first, the de Breda, de Breese, Court Paltas, and du Mans, and among the ornamental varieties the Chamois, Hollandais, Hermines and Padoue. The Bredas have already been described.

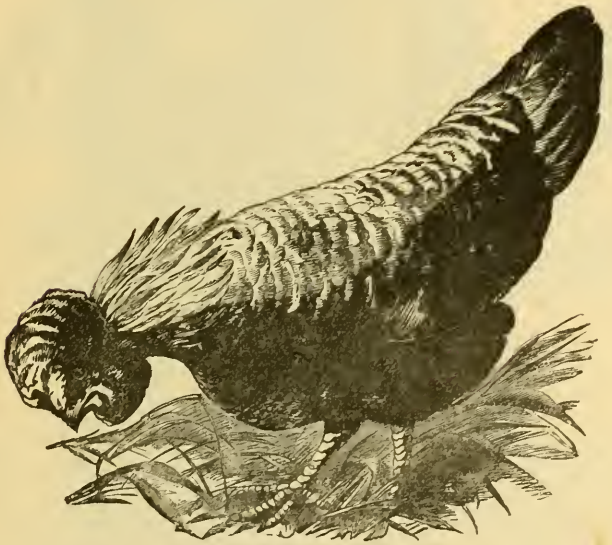


BLACK SPANISH FOWLS.

XV. The Houdans.

These fowls are held in France in fully as high estimation as are the Dorkings in England. They are hardy, easily raised, fatten kindly, lay good sized eggs, and are of a most excellent quality of flesh. They are a five-toed race, and are reported to have originated between a cross of

the Dorking and the Silver Padoue. They should be of a white and black color, evenly distributed, making them distinctly speckled. Red feathers are not admissible, but an occasional stained feather is sometimes seen in the best fowls. They are very French-like, sprightly, vivacious, loving to wander, but bearing confinement well. The comb is double leafed, and they have whiskers and beard growing well up on their face, which, with the crest or top-knot, gives them a curious and yet striking appearance. The crest of the hen especially being thick and full. In shape they resemble the Dorking, but are less in size. In every respect they are brilliant and striking in appearance.

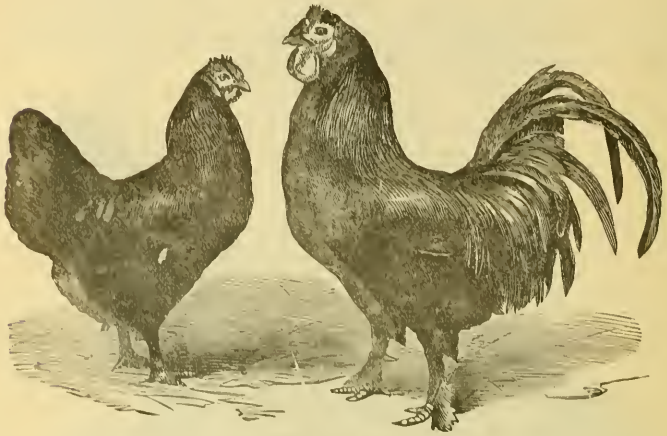


HOUDAN HEN.

XVI. La Fleche Fowls.

These handsome fowls are very tall but compact; in size equaling the Dorking; yet black, firmly knit, with strong, long limbs; the body rather angular, the plumage firm and dense. The head is handsome, with spikes of feathers behind the comb, looking like a double horn. They have small protuberances between the nostrils, which latter are full and expanded. They have large, opaque ear lobes, cravat like, very long

pendant wattles, a moderately curved beak, neck hackles long and fine, reflecting violet and green-black colors, as do the breast, wings and upper tail feathers. The legs are long, slate-blue in young fowls, and a lead-gray when old. The hen is colored like the cock. The cocks arrive at their full growth at eighteen months old; the hen at twelve. The flesh is considered the finest and most valuable of any French breed.



LA FLECHE FOWLS.

XVII. The Creve Coeurs.

This is the most striking of the French breeds, their black crested heads being curiously relieved with deep crimson, forked or antlered-like comb. Their aspect is bold and stately, the plumage black, shaded with green, thick and shining. The comb must be conspicuous and full, wattles long and deep, breast large, full and deep, the back straight not drooping. The legs should be strong, firm, leaden blue, in color, and short, with strong claws. The hen should have a soft, thick, round crest, and very little comb and wattles. The color must be entirely black, no other color being admissible in pure bred fowls. Old birds, however, will sometimes show an occasional white feather in the crest.

XVIII. Large Asiatic Breeds.

Of the numerous breeds and sub-divisions of these gigantic fowls, the Cochin-China and the Brahmas stand confessedly at the head. The Shanghaes, and the Chittagongs have, of late, fallen into disrepute, and

CREVE COEUR FOWLS.

confessedly so, from the superiority of the Cochins and the Brahmas. In the Shanghae family there are various colors. Gray, buff, cinnamon, partridge-colored and black. Twenty-five years ago they were regarded with especial favor, from the fact that they were of the then largest size known. It must be confessed that when bred pure they are quiet, good

sitters and nurses, little inclined to ramble, and among the best foster mothers to other chickens that can be found.

BUFF COCHIN COCK.

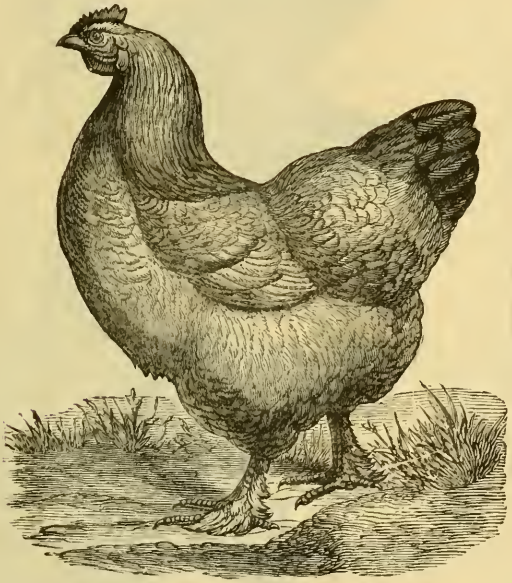
XIX. The Chittagong.

This is a giant among fowls, the cock often standing twenty-six inches in height, and notwithstanding their long legs and necks, they are majestic looking. There are two principal breeds, the gray being the larger breed. In the dark red variety the breast and thighs are black. The hens yellow or brown; legs in both sexes being yellow, heavily covered with black

feathers, and the carriage in all the varieties graceful, majestic, prompt and easy.

XX. Buff Cochins.

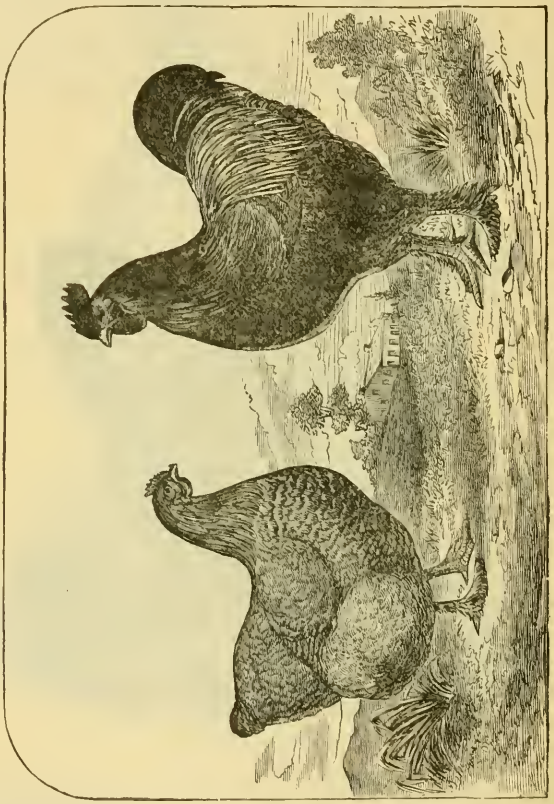
There are several varieties, in color buff, lemon, and cinnamon, the result of peculiar crosses and breeding. The buff is the true type of the colored sorts, and for utility we think the best. The cock should be upright and strong in his carriage; breast broad, not full, but forming a nearly straight line between the crop and thighs; back short and wide; tail only slightly raised; legs strong and with great thighs and saddles.



BUFF COCHIN HEN.

The head is small, for so long a bird; the beak yellow, stout, short, curved, and strong at the base; comb single, not large, and with rather small wattles, florid, thin and fine; the ear lobes well developed, long, thin, fine, and entirely without white. The eye of the cock should be of an ochre-yellow color, and in the hen a darker hue. The hackle of the cock should be full, spreading over the thighs, and of a light bay color,

and free from markings of any kind. The hackle of the hen is a clean, distinct buff. A slight penciling is admirable, a dark colored one not. The saddle of both cock and hen should be free from markings. A black tail in the cock is admirable, and if the principal feathers are bronzed, so much the better. The breast of both cock and hen should be clear buff,



PARTRIDGE COCHINS.

becoming lighter toward the tip, with a wavy appearance in the sun, and both primary and secondary quill feathers should be buff, without other color. The legs should be heavily feathered, covering the outside toe, and partly the one behind. Vulture hocks, as shown in the Black Breda

variety is not admissible, as they not only show mixed blood, but are unsightly.

XXI. Partridge Cochins.

These are admirable fowls. Among the heaviest of the Asiatic breeds, attract attention wherever shown, from their round, full, plump forms, elegant feathering and majestic carriage.

The head of the Partridge Cochin is a rich orange red. The hackle and saddle feathers the same, but each distinctly marked down the middle with a black stripe. The back, shoulder-coverts and wing are self colored, red and darker than the hackle; the lower wing-coverts black, with greenish or blue reflections forming a "bar" across the wing; the primary wing feathers black, edged brown or bay on the lower edges; secondaries bay on the outer edges and black on the inner, each feather black on the end, forming a black edge on upper side of the butts of the wings; the breast, thighs, tail and leg feathers black and without other color; the leg dusky yellow. The hen should have her hackle golden yellow, each feather striped black along the center, the rest of the plumage light brown, penciled with dark brown, the pencilings over the body should be dense, and the purer the brown the better. On the breast the pencilings should be crescent shaped. Legs dusky yellow, penciled brown as in the body.

XXII. White Cochins.

White Cochins should be white, pure white all over. This purity in color is essential, since a yellow or other tinge detracts from the beauty of the bird. The cock should have a medium sized, straight, smooth, freely serrate comb, large, red, deaf ears, large wattles, red eye, strong, yellow beak and legs, and with plenty of feathers on the feet. This feathering should be characteristic of all Cochins, avoiding as far as possible any tendency to vulture hocks. Breed also to large stock, of good carriage, and you will have in the progeny as pretty a sight for fowls as could well appear, either in the farm yard or on the grass.

The hen should be large; the head, beak, eye, deaf ears and wattles colored as in the cock. Avoid especially a grayish eye. It is supposed to show a tendency to blindness and a generally weak constitution. The body must be broad, the tail small, almost covered with the soft feathers about it, and with well feathered rumps and plenty of fluff.

XXIII. Brahma Fowls.

These majestic fowls, said to have been originally brought from the banks of the Brahma-pootra river, which waters the fertile territory of

WHITE COCHIN FOWLS.

Assam, are divided into two classes, the light and dark, each having their special admirers, and either good enough for any farm yard. As a rule however, the dark are more highly esteemed, and the fowls sell for higher prices than the light.

The head of the dark Brahma cock should have a pea comb, that is, three combs running parallel to each other, and with the length of the head, the middle one the highest; the beak strong and curved, ear lobes red, and falling below the wattles, which should be full, and like the ear lobes, deep red; the neck short, well curved, with the hackle full, silver white, striped with black, and flowing over the back, and sides of the breast; the back strong, very short, wide, flat, the feathers almost white, the saddle feathers long and white, striped with black; the tail small, soft, upright, the feathers on the rise from the saddle to the tail, and the

side feathers of the tail a pure lustrous black; the breast full, broad, rather prominent, the feathers pure black tipped with white, and the feathers at the head white; the saddle feathers and thigh fluffs ample; the wings small, with a good black bar across them; the wings well tucked under the saddle feathers and thigh fluffs; the fluff on the hinder

DARK AND LIGHT BRAHMAS.

part of the thighs black or dark gray, the feathers on the lower part of the thighs soft and nearly black; legs short, yellow and profusely covered with feathers on the outside.

The marking of the hen is almost identical with that of the cock, except that it is more uniform all over except the head and tail, each

feather closely penciled, with dark steel gray on a dingy white ground, and extending nearly up to the throat, on the breast. In carriage, the hen is not so upright as the cock, and the legs are shorter.

XXIV. Light Brahmas.

Pure bred fowls are mostly white in color, on the outside, but if the feathers are parted, the under plumage is bluish-gray. This distinction is strongly marked as between the Light Brahmas and White Cochins, which latter are white to the roots. The head is of the same general shape as in the dark variety, and with pea combs; the ear lobes and wattles are pure red; the neck hackles are distinctly marked with a black stripe down to the center of each feather, on a white ground; the quill feathers of the wings are black, but when folded the wings should show only white; the tail should be black, tolerably upright, but opening out like a fan, and the within tail coverts reflecting a peculiar green hue in the sunlight; the legs are yellow and well covered with white feathers, sometimes slightly mottled with black. The hen is colored like the cock, except that the plume may be somewhat darker, and the general appearance more sober in color. The tail should be black and smaller than that of the cock.

XXV. Frizzled Fowls.

One of the most curious of the Oriental breeds, and occasionally seen in the yards of amateurs and fanciers, are the frizzled fowls originally brought from Java. Linnæus named them *Gallus pennis revolutis*, or fowls with feathers rolled back. The color should be white, though they are also bred black and brown. They are certainly curious and interesting as showing freaks in breeding. So far as value, in comparison with other breeds is concerned, it is *nil*.

XXVI. Silkies.

Far more ornamental in appearance, and really of some value, are what are known as Silkies. The best specimens are pure white, and have this peculiarity, the webs of the feathers lack cohesion and are filamentous, hence giving the silky appearance to the plumage.

They are sometimes called negro fowls, from the fact that the skin is of a dark violet color, almost black, and the comb and wattles often dark purple, low and flat and covered with small warts. The bones are also covered with a dark membrane, which altogether makes this breed the most singular and interesting of the gallinaceous tribe.

XXVII. Breda or Guelder Fowls.

The Breda or Guelder fowl is peculiar in some repects, and shows that there is an infusion of Asiatic blood, although they are Polish in shape and closely related to this breed. They are of various colors, but

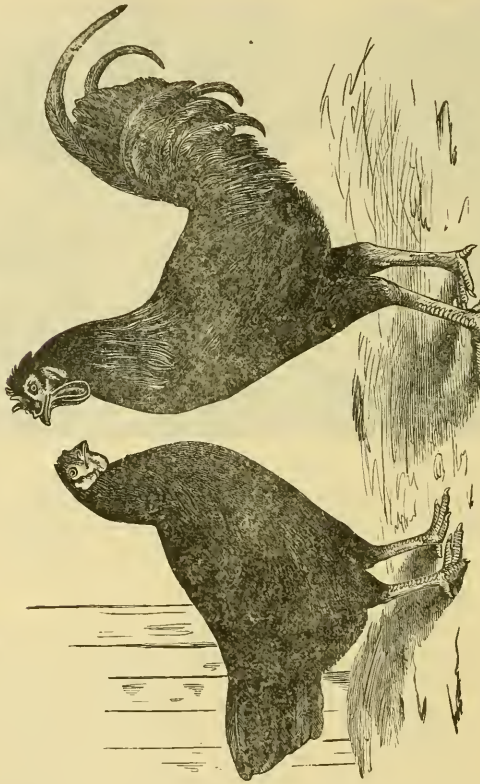
PAIR OF SILKY FOWLS.

the only true families that are bred in the United States are the Cuckoo or Dominique marked, called Guelders, and those pure black, denominated Breda, though we believe the true Breda is applied to all the Guelders, not Cuckoo marked. They have a crest, only just perceptible, and of the same color as the body.

Whatever the color, they are lightly feathered on the legs, which are slaty-blue, and the thighs are vulture hocked. They have no comb, but a depression where the comb should be; the nostrils are cavernous, and particularly conspicuous. The cut given will show their general appearance, and the likeness of a Breda head given on a previous page will show the chief peculiarity of the head. In size they are medium chicks, ear lobes and wattles red and peculiar in shape, being extremely pendulous in the cock. The plumage is close and compact like that of game fowls, with large and flowing tails. The eggs are large, smooth and of good flavor, and the chickens are hardy and feather quickly.

XXVIII. Game Fowls.

The several varieties of game fowls are the most elegant and noble of the gallinaceous tribe. The cocks are watchful, courageous, always ready to attack an enemy whatever it may be, and fighting to the death. And of most elegant carriage and coloring. The hens are good mothers, lay



BREDA COCK AND HEN.

the finest meated eggs of any breed, are hardy, and excellent foragers. There is hardly a breed of "dung-hill" fowls, but what owe their good qualities to the infusion of this prepotent blood. This general description will suffice for all the varieties, which are innumerable, and belong

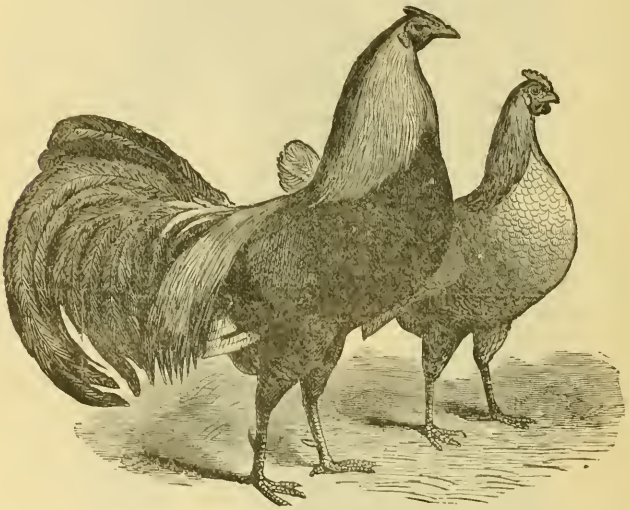
to every country, England, Ireland, Spain, Cuba, Mexico, Malay and China being the most celebrated for their strains of blood. In all these varieties of games the cocks are noted for the brilliancy of their markings and the hens for their soberness of color.

BROWN-BREASTED RED GAME.

The Brown-breasted Reds.

This variety is considered as one of the best of the games, an illustration of a group of which we give. In this breed the breast of the cock

should be red-brown, shoulder sometimes orange-red. The comb and face must be dark purple, the beak dark; wing butts dark red or brown, with dark talons; hackle with dark stripes; thighs like the breast; tail a dark greenish black; the wing crossed with a glossy, green-hued bar. The plumage of the hen should be very dark brown penciled with light brown; neck hackle dark, golden, copper-red, thickly striped with dark feathers; comb and face much darker than that of the cock. When the tail feathers are spurred and show a slight curve, it is considered indicative of strong blood.



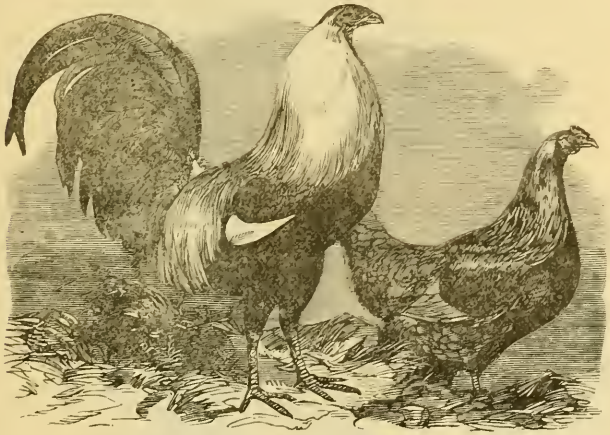
EARL DERBY GAME.

Earl Derby Game.

This magnificent strain which has been bred in great purity in England for over a century, are Daw-eyed, that is the eye is gray like that of the Jackdaw. They have a round, well knit body, on long, strong legs, with white feet and claws; the head is long, the bill lance-shaped and elegant; the face bright red, with small comb and wattles red; back intense brown-red; lesser wing coverts maroon colored; greater wing coverts marked at the extremity with steel-blue forming a bar across the wings; primary wing feathers bay; tail irridescent black; hackle well feathered, touching the shoulders; wings large and well quilled; back short; breast round and black; tail long and sickled, being well tufted at the root—

thick, short and stiff. The hen is thus succinctly and perfectly described by Beeton in his English work on poultry: "Head fine and tapering; face, wattles and comb bright red; extremities of upper mandible and the greater portion of the lower one white, but dusky at its base and around its nostrils; chestnut-brown around the eyes, continued beneath the throat; shaft of neck hackles light buff; web pale brown edged with black; breast shaded with roan and fawn color; belly and vent of an ash tint; primary wing feathers and tail black, the latter carried vertically and widely expanded; legs, feet and nails perfectly white." The carriage of both cock and hen of this breed is upright and dignified.

The pugnacious disposition of the cock equals that of any other game bird; and its endurance cannot be surpassed. Years ago they were numbered among the best breed of birds for the cock-pit; and for the table they are not surpassed by the sweet and nutritious flesh of the Dorking fowl.



DUCK-WING GAME FOWLS.

Duck-winged Game Fowls.

There are several varieties, including the Duck-winged game bantams. To our mind the best are the silver-gray, a pure-blooded, hardy and high couraged bird. The cock must be silver-gray in color; the head, comb, face, wattles and bill of the true game type; the first four of them bright red, the bill light colored; eyes red, skin white, and the legs white: the hackle is striped black underneath, but clean above; the breast a clean, nearly silver-gray; the back a bright silver-gray; the

lower part of the wings creamy white, crossed above with a bar steel-blue in color.

In the hen, the plumage should be a silvery bluish-gray, frosted with white; neck hackle silvery-white, striped with black, and the breast a

WHITE GEORGIAN GAMES.

pale fawn color, more subdued than in the cock. The other characteristics, as to face eyes and feet, etc., should be identical with that of the male bird.

White Georgia Game.

This variety, originally bred in Europe, but brought into Georgia many years ago, and since carefully bred in various parts of the South, are game in the pit, and most excellent farm fowls, being hardy, courageous, and the flesh most excellent in quality. For beauty of plumage, elegant shape and lofty carriage, they have few if any superiors.

In the color they should be pure white all over, with no shade whatever on neck, breast, hock or tail. The legs may be white or yellow. We prefer the yellow, since it is an indication of a stronger constitution. The beak should harmonize with the legs, and the comb, ear lobes and wattles must be of the deepest vermilion color. Such a breed on the lawn makes one of the prettiest sights we have ever seen, and in quality of the flesh they have no superiors.

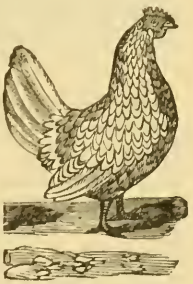
Game Bantams.

These are small varieties of the more common large breeds. Alert, courageous little fellows, some of them not larger than good sized pigeons, but fully capable of driving any ordinary barn-yard fowl, however large it may be. The more prominent of these are the Black Breasted red game bantams. As pets they are most attractive and may be kept with any of the large breeds without danger of intermixing as to the hen bantams.

Other Bantams.

The most highly prized of the fancy bantams are the golden and silver spangled Sebright bantams. There are also bantams of the white and black races of smooth-legged fowls, as there also are of the Asiatics.

Sebright Bantams.

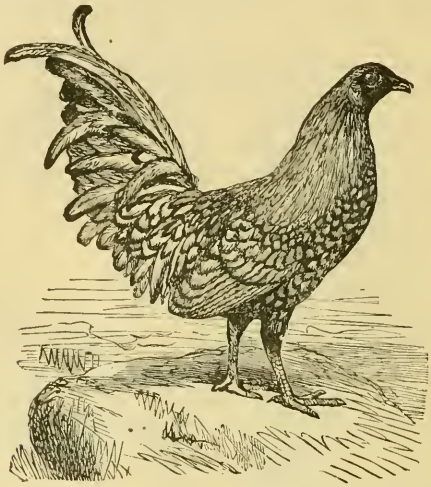


SEBRIGHT BANTAM.

There are two varieties of these, the golden penciled and the silver penciled, identical in shape and markings except the color. Both varieties are remarkably beautiful: pert, lively, vigorous, and when small and well bred, among the nicest pets of the farm-yard. The plumage of the Silver bantam is of a silver-white color with a jet black margin. The Golden variety is identical except that the ground color of the plumage is golden. The legs are smooth, the heads are clean, the comb double and pointed at the back, and the tail straight and without the long sickle feathers. Whether they be golden or silver spangled, the value of the birds consists in the delicacy and pencilings of the markings. The cocks

should not weigh over twenty ounces at most; the hen not more than sixteen. Hens have been shown weighing not more than twelve ounces.

A peculiarity of this variety is, that occasionally an old or a barren



BARREN, FULL FEATHERED.

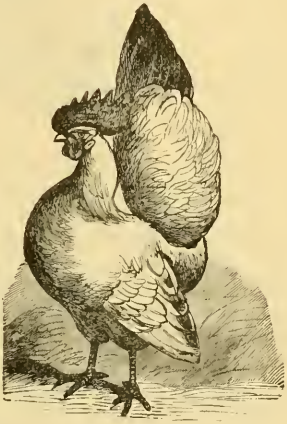
female will assume the plumage of the cock. When we remember that the males of this breed are what are called hen-tailed, the remarkable reversion, as shown in the cut, of a hen, will be interesting to the scientist and curious to all.

Japanese Bantams.

Among the most curious of the bantam tribe are the Japanese bantams. In this rare breed, the body must be as pure white as possible, the tail black, the sickles very long, upright, little curved, but carried over the back as shown in the cut. The shafts of the sickle feathers white; the comb large, upright, not too strongly serrated; wattles long and red; legs very short and yellow. The body of the wings should be white, with black flight feathers. The hen should be fan tailed, and the comb crinkled. They are quiet, easily domesticated. The hens are good layers and good nurses. The chickens are tender, and for this reason should not be hatched before the weather is warm. In fact as small size in ban-

tams is an essential point, the best chickens are fall-hatched and kept through the Winter with only feed sufficient to continue them growing fairly and to keep them in good health.

JAPANESE BANTAM COCK.



JAPANESE BANTAM PULLET.

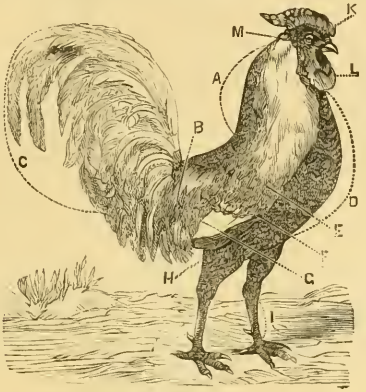
CHAPTER III.

BREEDING.

THE PLUMAGE.——IDEAL SHAPE.——BREEDING TO TYPE.——DISPARITY IN SEXES. MATING.——BREEDING GRADES.

In the breeding of poultry it is absolutely necessary that the breeder have a good and clear idea of the points of fowls. For this reason we give a series of illustrations showing the entire fowl, and also others accurately figured and explained, so no reader can err. It is absolutely necessary to a correct understanding of any business or profession that a correct knowledge of the technicalities connected therewith be had. The poultry breeder must not only understand how to feed and rear chickens but he must have a nice discrimination as to plumage, the chief characteristics of the several breeds of fowls, and their peculiarities of constitutional vigor, style, carriage, etc., but he must also understand something of the anatomy of the fowl, their points, and also those relating to outward parts, and the technical terms used in describing the several parts. In addition to what follows we have prepared a pretty complete glossary which will be found at the end of the chapters, so that any person may easily inform himself as to the several terms used by the fanciers and breeders. The technical terms used by poultry fanciers, in describing the points of a fowl, are not always understood by the uninitiated.

For the benefit of such we give an illustration, with lettered references, which will supply the necessary information on the subject



POINTS OF POULTRY.

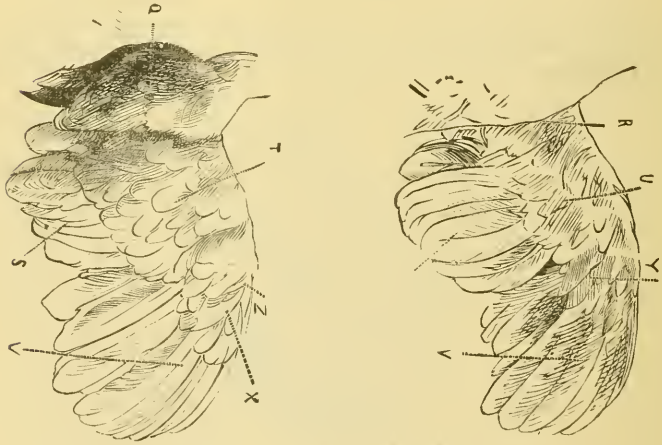
Explanation—*A*—Neck hackle. *B*—Saddle hackle. *C*—Tail. *D*—Breast. *E*—Upper Wing coverts. *F*—Lower Wing coverts. *G*—Primary quills. *H*—Thighs. *I*—Legs. *K*—Comb. *L*—Wattles. *M*—Ear lobe.

POINTS OF THE HEAD OF COCK.

Explanation.—1—The comb, which surmounts the skull. 2—The wattles, which hang underneath and on each side of the beak. 3—The ear wattles,

which hang under the cheek. 4—The tufts of little feathers, which cover and protect the auditory organ. 5—The cheeks, which commence at the beginning near the nostrils, cover all the face and re-unite behind the head by a continuation of the flesh of the same nature, but covered with feathers. 6—The nostrils, which are at the beginning of the beak. 7—The beak, of which the two parts, the upper and lower mandible, are horny.

The head of the cock, as of the hen, is composed of two principal parts: 1st, the skull is a firm union of bones, which include the upper part, or mandible, of the beak; 2nd, the lower part or mandible of the beak, being the lower jaw-bone, formed by a single piece. In the skull are the sockets or cavities which contain the eye; the nostrils are in front of the eye; the auditory organ, or ear, is behind the eye. The head, excepting the beak, is entirely covered by a fleshy covering, round which may be seen several appendages or caruncles, which are the crest, the two ear-lobes, and the two ear-wattles. This covering forms the cheeks, the color, the size; the form of each of these parts is varied according to the variety, and often serves to characterize each. A tuft of short feathers called "the tuft" covers the auditory organ.



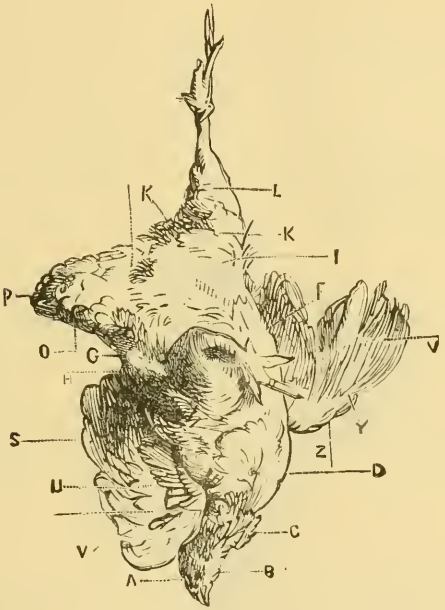
ANALYSIS OF WING PLUMAGE (See following Page)

The comb is straight or drooping: it is single when it is composed of only one piece, double when there are two alike united or near together, it is triple when it is formed of two alike and one in the middle: it is frizzled when full of granulations more or less deep, and erect excrescences, it is a crown when it is circular, hollow, and indented; it is goblet shaped

when hollow, vascular, and not indented. There are other forms but they are composed of parts or unions of those particularized.

The Plumage.

With the hen there may be three kinds of feathers distinguished: 1. The large feathers on the wings for flying, and on the rump to form the tail; 2. the middle-sized feathers which cover the large feathers, and are



POINTS OF THE FOWL.

also found on the wing and rump; 3. the neck, the back, the sides, the throat, the shoulders, and a part of the wings. They are always in layers compactly covering those beneath them like tiles. We shall designate them by the name of the places they occupy, and refer to the engravings to render them easy to recognize:

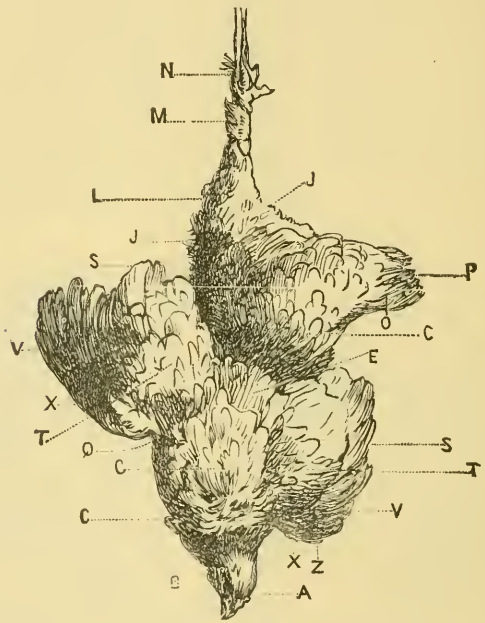
Explanation—*A*—The upper feathers of the head are very small in those fowls not tufted. They surround the skull.

B—The underneath feathers of the head are almost like bristles. They cover the cheeks in the space which separates on the wattles.

C—The upper feathers of those at the back of the neck are short, and lengthening lower down, forming what is called the hackle. They become longer between the shoulders when they cover the beginning of those on the back and the commencement of the wings.

D—The feathers of the back, forming a layer about 10. These feathers are of the same nature as those of the neck, but a little larger, and form the saddle.

F—The feathers of the breast cover the entire length of the two breast muscles, extending beyond the breast-bone at each side and uniting at its end. The whole forms what is termed the breast. These feathers, with the feathers of the loins, overlap those of the sides.



SHOWING POINTS.

G—The feathers on the sides cover the loins, taking in the back as far as the rump, which they go beyond and cover the lower part of the feathers of the tail. They also cover the commencement of the feathers of the flanks, thighs and abdomen.

H—The feathers of the flanks are light and fluffy. They cover the upper part of the thigh feathers and slip under those of the breast.

I—The feathers of the abdomen cover and envelope all this part from the end of the breast to the rump. These feathers are generally fluffy, of a silky nature and spread out in a tuft.

J—The outside feathers of the thigh cover those of the abdomen and leg.

L—The outside and inside feathers of the leg stop at the heel, or in some varieties they proceed lower and form what are called ruffles or vultured hocks.

M—The feathers of the feet or sole are long, short, or entirely absent, in the different varieties. These feathers are along the shank in either one or several rows. They are always on the outside part.

N—The feathers of the toes appear on the outsides.

O—The middle tail feathers envelope the rump and cover the bases of the large feathers of the tail.

P—The larger tail feathers are in a regular line of seven on each side of the rump, and form the tail.

Q—The outside feathers of the shoulders cover a part of the other feathers of the wing. They form the shoulder.

R—The inside feathers of the shoulders are small, thin, and slender.

S—The larger feathers of the pinion form, where the wing is opened, a large, arched surface, and are of different sizes. These feathers grow out of the under side of the pinion.

T—The small outside feathers of the pinion are of different sizes. They come on all the outside surfaces from the shoulder to the pinion. They begin quite small on the outside edge, and finish a medium size on the inside edge.

U—The inside feathers of the pinion are close, middle-sized, and small, covering the bases of the large feathers of the pinion.

V—The large flight feathers, or feathers of the hand, are large and strong, and are of most use to the bird in locomotion. They begin at the under edge of that which is called the top of the wing.

X—The outside flight-feathers cover the large ones; they are stiff and well flattened on the others.

Y—The inside flight-feathers are, some small and others medium-sized; cover the bases of the flight-feathers.

Z—An appendix called the pommel of the wing, which represents the fingered part. It is at the joint of the pinion and has some middle-sized feathers of the same description as the large pinion feathers, and have some small ones to cover them. These feathers assist in the flight.

When the whole wing is folded, almost all the feathers are hidden by the larger feathers of the pinion and middle external feathers. Classification of the feathers of the cock are the same as those of the hen, but the forms of some of them are different.

Ideal Shape.

The cut on next page will serve to show the contour of the fowl, the Dorking being the one selected on account of its compact body; and the nearer the fowl comes to the ideal the more profitable it will be. Nevertheless it must be remembered that each breed has its peculiar characteristics and that some one point must often be sacrificed in favor of another.

Breeding to Type.

In the breeding of poultry, as well as farm animals, there should be no violent crosses made. In fact, none but the thoroughly scientific breeder, who has given his life study to the task, should undertake

crossing with a view to forming a new breed. It will not pay. The general breeder should get the best representatives of the breed he pro-

BREEDING TO TYPE.

poses to use and confine himself to it. No more than one breed should be allowed on the farm. If so it will end in intermixing and confusion. No more should be attempted than by careful breeding and selection to perpetuate the strain in its purity, and if possible to improve it. A careful study of the foregoing will render this possible, and thus any farmer may breed a given strain equal to the best.

The cock should be large, broad breasted, strong winged, muscular, easy on his legs, and of strong points in his plumage; the hen from good laying stock or a good mother as the case may be.

Disparity in Sexes.

As to the number of hens to the cock it will vary with the breeds. With Games, Dorkings, Houdans and Creve Cœurs they may be eight or ten to one; Spanish, Cochins and Brahmas, ten or twelve to one; Hamburgs twelve or fourteen to one. If the flock is large enough so two or more cocks are kept all but one had better be confined, giving them in succession to the flock, and it is better in large flocks to have a reserve to use when necessary. By this plan much fighting over and unnecessary worry of the hens will be saved. If too many males are allowed to run there will be a loss in eggs, and if too few they will be deficient in fertility, this being one of the greatest drawbacks to this system. So, as between the two, always buy eggs for setting from breeders who give their flocks

a good range, and are careful that the hens have neither too few nor too many males.

Mating.

Always mate a short, compact, deep-bodied male, with long-backed hens, but not the reverse, and as a rule, for the best results the hen should be over one year old when she sets. From that to four years she will do the best. Do not be afraid of breeding in-and-in. Unless carried too far it will result in better success than out crosses. So in breeding to color let all self colors be as solid as possible, and in parti-colored breeds study their characteristics, and breed as near to a feather as possible. Avoid vulture hocks in all poultry, and especially so in the Asiatic breeds In breeding Brahmas and colored Cochins have plenty of color in the males, as the tendency is to get lighter. Yet in this discrimination must be used. If the saddle is very heavily striped, or the neck hackle very dark, the chicks will be apt to run to spots. Yet as a rule heavily-penciled males must be used to get heavily-penciled cock chickens. So very dark hackled cocks and hens with the hackles lightly penciled will produce chickens with delicately penciled hackles.

Breeding Grades.

If you cannot get fowls pure get a well bred cock and keep with a few of your select hens. Breed him again to his chicks, so long as he lasts; thus by the exercise of judgment you may have very superior poultry in a short time. A better way, however, is to get a setting of pure eggs and commence right at once. They cost comparatively little, are easily sent by express, and will soon repay their cost.

CHAPTER IV.

MANAGEMENT OF FOWLS.

GOING INTO BUSINESS. —— VILLAGE YARDS. —— THE POULTRY HOUSE. —— PROPER FOOD FOR FOWLS. —— BEST BREEDS FOR MARKET. —— EGG PRODUCERS. —— HOW TO FATTEN. —— HOW TO KILL AND DRESS FOWLS. —— PACKING FOR MARKET.

Going Into Business.

Before going into the business of raising poultry be sure and have comfortable quarters for the fowls. These need not be expensive structures, poles and hay will make a warm, comfortable roosting and nesting place, until something better can be provided. Be sure that plenty of dry dust for bathing is supplied at all times. It is the great remedy against lice, to which fowls are especially liable. This with plenty of sun, plenty of pure water, and liberal feeding, will insure success both in eggs and chickens. Do not over crowd the house. See that everything is kept scrupulously neat and clean. If you build a permanent house, know that there is to be plenty of ventilation; all birds require a large amount of fresh air. Plenty of heat, plenty of food and water, and plenty of fresh air are what give plenty of fresh eggs in Winter, when they are scarce and high. In the Summer let the fowls range over the farm as much as they will, they will thus be paying for their keep in destroying insects, and keeping themselves healthy; we are writing for farmers, and not fanciers. In villages the case will be different; there, fowls must be kept shut up a great part of the time.

Here, some tact must be used. If the fowls must be kept up during the day, let them out for a run, an hour before sundown, in the street or alley; they will come back all right at feeding time. What you lack in range, you must make up in care and attention to the wants of the fowls, and in the economy of the hen house, and the little range of grass which they may have. Green food of some kind must be given. Cabbage, lettuce or onion tops, chopped, are all good. Animal food must also be provided; any rough meat will do if chopped. One of the mistakes often made is feeding too much at a time. Give them their food so they may take it at will, if it can be kept clean, or throw down food to them liberally, so long as they eat eagerly, and, make them eat pretty clean.

The Poultry House.

The poultry house should face the South on one of its broad sides, and the more glass you have in this, the better. One portion should be half dark for the nests, and, for setting hens, this should be large enough so a dust bath may be supplied also. The roosting place may be in one end, and should not be more than two feet from the floor, especially if the breed be heavy. The perches should be all on a level, and pretty large. A two by four scantling nicely rounded and set on edge, is not too large for the heavy birds. Keep everything about the house scrupulously clean. Whitewash at least once a month with lime and if lice make their appearance, fumigate the house, and sprinkle Scotch snuff among the feathers of the fowls. Follow this up until the lice are exterminated.

Proper Food for Fowls.

Never give fowls sloppy food. When mixed feed is given, it should be made as stiff as possible. Never feed in a trough, it cannot be kept clean. Have the dough so stiff that, as it falls from the hand it will break, and so, feed on clean ground. Indian meal and small potatoes cooked together and fed pretty hot in Winter, with a little chopped onion intermixed, makes a good food. Have broken bones, lime rubbish and gravel always where fowls can get it, and in Winter a sheep's pluck hung where the hens can just reach it, by jumping up to pick it piecemeal, will keep the fowls in good laying trim. Chandler's cake is good, if other meat cannot be had. This may be broken fine and mixed with one of their daily feeds. Be careful, however, that you do not overfeed with meat. If so, it will show in loss of feathers and general ill health.

Best Breeds for Market.

We do not believe there are any better market fowls, all things considered, than the Brahmas and Cochins. The Dorkings are undoubtedly the most superior table fowls; they are also tender and harder to rear.

As a cross for early plump table breeds, a Dorking cock crossed on Brahma or Cochin hens will give fast growing, plump chickens of early maturity. In this, however, fancy has much to do.

The Asiatics are not great layers, but by using judgment, fully as many eggs can be got from either Brahmas or Cochins in Winter as from any other breed, and Winter eggs are what bring money. Give them warm and roomy quarters, with plenty of range for exercise, with liberal feeding, including green vegetables, and they will bring you money in eggs.

Egg Producers.

The Poland, the Leghorn and the Houdan are inveterate layers, and their eggs are good. The Hamburgs are good layers, but like the black Spanish, tender, and more fit for the amateur than the practical man. For eggs, there is little doubt that the Polands should carry the palm. For young chickens for market, Brahmas and Cochins, and for home table use, the Dorkings are best. Why, then, asks the reader, have you described so many fowls? The answer is, so that the table being well filled, you may take your choice of breeds.

How to Fatten.

When ready to fatten, poultry should be always confined in a small space; the smaller the better. Two weeks should make them fat. If kept after they are fat, or when they cease to increase, they again immediately lose flesh. The best food in the West is corn-meal, boiled into a very thick mush, and then made as thick as possible, while scalding hot, by mixing in all the meal that can be worked. The fowls may be kept in well-ventilated coops, feeding them three times a day with the feed warm, and allowing them plenty of water and gravel all the time, except for the last week, when the gravel may be omitted. The coops must of course be kept clean, and should be small enough so the fowls cannot turn around: should be littered with clean straw, and never allowed to get foul. If, instead of water, their drink is skimmed milk, they will become extra fat.

How to Kill and Dress Fowls.

Never kill your fowls until they have fasted twenty-four hours. No man ever made any money by selling his fowls with their crops stuffed to make them weigh. The petty fraud is too apparent. To kill and dress, tie their legs together, hang the fowl up, open the beak and pass a sharp pointed, narrow bladed knife into the mouth and up into the roof, dividing the membrane. Death will be instant. Immediately cut the throat by dividing the arteries of the neck and the bird will bleed thoroughly.

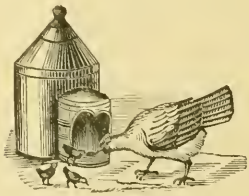
We never scald; the nicest way is to pick the fowl dry and while yet warm. A little care will prevent tearing the flesh, and the bird will bring enough extra in the market to make it pay. Most persons, however, will prefer to scald, and for home consumption, or the village market this will do.

Have the water just scalding hot—*not boiling*—190 degrees is just right. Immerse the fowl, holding it by the legs, taking it out and in, until the feathers slip easily. Persons become very expert at this, the feathers coming away by brushing them with the hand, apparently. At all events, they must be picked clean. Hang turkeys and chickens by the feet, and ducks and geese by the head, to cool. It should be unnecessary to say that under *no* circumstances whatever, should ducks and geese be scalded; they must invariably be picked dry. Take off the heads of chickens as soon as picked, tie the skin neatly over the stump, draw out the insides carefully, and hang up to cool. Never sell fowls undrawn. They will bring enough more drawn and nicely packed, with the heart, gizzard and liver placed inside each fowl, to pay for the trouble. Let them get thoroughly cool—as cold as possible—but never, under any circumstances, frozen. There is always money in properly prepared poultry; the money is lost in half fitting them for market, the fowls often being forwarded in a most disgusting state. There is money in the production of eggs; there is money in raising poultry for the market. The money is lost in improper packing and in a foolish attempt occasionally made to make the buyer pay for a crop full of musty corn, at the price of first-class meat. It is that class of men, however, who are too smart ever to make money at anything.

Packing for Market.

The poultry, having been killed as directed, carefully picked, the heads cut off, and the skin drawn over the stump and neatly tied—or if preferred, leave the head on, the fowl will not bring less for it—and the birds chilled down to as near the freezing point as possible, provide clean boxes and place a layer of clean hay or straw quite free from dust, in the bottom. Pick up a fowl, bend the head under and to one side of the breast bone, and lay it down flat on its breast, back up, the legs extending straight out behind. The first fowl to be laid in the left hand corner. So placed, lay a row across the box to the right, and pack close row by row, until only one row is left, then reverse the heads, laying them next the other end of the box, the feet under the previous row of heads. If there is a space left between the two last rows, put in what birds will fit sideways. If not, pack in clean long straw, and also pack in straw at the sides and between the birds, so they cannot move. Pack straw enough

over one layer of fowls, so that the others cannot touch, and so proceed until the box is full. Fill the box full. There must never be any shaking, or else the birds will become bruised, and loss will ensue. Many packers of extra poultry place paper over and under each layer before filling in the straw. There is no doubt but that it pays. Nail the box tight; mark the initials of the packer, the number of fowls and variety, and mark plainly the full name of the person or firm to whom it is consigned, with street and number on the box. Thus the receiver will know at a glance what the box contains, and does not have to unpack to find out. These directions, if carefully carried out, might save a person many times the cost of this book, every year.



FOUNTAIN FOR POULTRY.

CHAPTER V.

THE HOME OF THE TURKEY.

VARIETIES OF THE DOMESTIC TURKEY. —— I. THE COMMON TURKEY. —— II. ENGLISH TURKEY. —— III. THE HONDURAS TURKEY. —— IV. BRONZED-BLACK TURKEY. —— V. GUINEA FOWL —— VI. THE PEACOCK.

Although it is only about three hundred years since the turkey—from any well authenticated accounts—was brought under domestication, we already see them broken up into several distinct breeds, although there are but two wild varieties, the brown turkey of North America, and the Honduras turkey of Central America; a cut of the latter being shown on following page, and of the former the introduction to poultry in general, illustrate these varieties.

There is, however, one fact peculiar to the turkey as with pheasants. It still retains and persistently holds many of its wild traits. It is shy, intractable, does not care for home, and like the pea fowl and guinea fowl, is much inclined to wander. When full grown, and indeed after becoming full fledged, they are the hardiest of domestic fowls; in fact, as hardy as any of our Winter species of wild breeds; yet when young, they are the most delicate, tender and easily chilled. For this reason they should never be hatched until the weather, both nights and days, is warm; and for the reason that the hen turkey is so careless of her

young, and so poor a provider, we have always raised them under careful hens, giving a large hen seven eggs and aiming to have two broods come off at once, giving both broods to one nurse

WILD TURKEY.

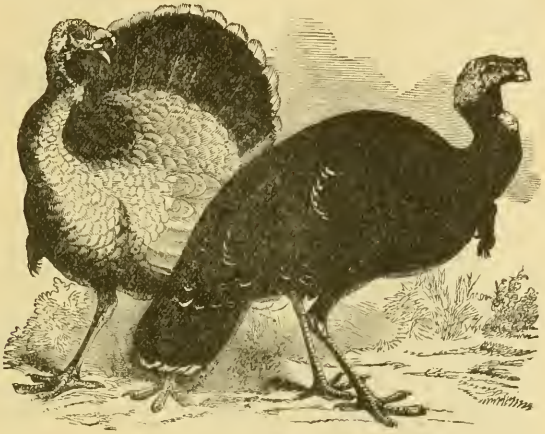
The eggs require from thirty to thirty-two days to hatch, and for the first four weeks the young chicks should be carefully watched. They will neither stand the hot sun, heavy rains, nor much dew, and they must be kept warm. Hard boiled eggs rubbed up with oatmeal or cornmeal is a good food for the first two weeks. After which, light wheat and cracked corn may form the staple. About the time they acquire the red head, which is at about six weeks of age, which next to the third day is the most critical period of their life, they should have nutritious food, and, if a little bruised hemp seed is added, so much the better. In feeding give but a little at a time and often, and that out of the reach of the hen or other fowls. Young onion tops, chopped very fine and well mixed with the food is excellent. Curds of sour milk are eagerly eaten, but should not be given as a constant food. Pure cold water must always be at hand as a drink, but occasionally, say once a day, skim milk may be given. Where cornmeal is the basis of the food, it should always be cooked into a hard mush before being fed.

Varieties of the Domestic Turkey.

These are the bronze, the English (so-called) turkey, the white, the buff, and the crested turkey. The latter is extremely rare, having been supposed to have originated in Europe, in the early part of the last century, then entirely lost, and again said to have been recovered, curiously enough, from Africa.

Temminck, in a work relating to pigeons and fowls, printed in Amsterdam in 1813, mentions them as follows: The crested turkey is only a variety or sport of nature in this species, differing only in the possession of a feathered crest, which is sometimes white, sometimes black. These crested turkeys are very rare. Mademoiselle Backer, in her magnificent menagerie near the Hague, had a breed of crested turkeys of a beautiful Isabelle yellow, inclining to chestnut; all had full crests of pure white.

Lieutenant Byam described crested wild turkeys as having been seen by him in Mexico, but it is supposed he must have mistaken curassows for wild turkeys, since no others have been able to find them, and the curassow is thoroughly domesticated there. The white and buff turkeys are simply varieties in color from the common forms, which have in some instances been perpetuated by careful breeding and selection. So also there are copper-colored, fawn-colored, party-colored, and also gray turkeys. These can hardly be considered worthy of breeding except in an amateur way for amusement.



COMMON TURKEYS.

I. The Common Turkey.

These are pure white and black mixed, with the peculiar wattle and head of the wild turkey. They are of medium size, less given to wandering than some of the breeds, and will weigh dressed, if fat, at seven or eight months old, from ten to twelve pounds, and at full maturity sixteen pounds.

II. English Turkey.

This is simply a modification of our common turkey, which by careful breeding has been made uniform and of an increased size. Of these the Norfolk turkey is black, with a few white spots on the wings. The breed most valued in Cambridgeshire is a bronze-gray, and longer legged than the Norfolk variety.

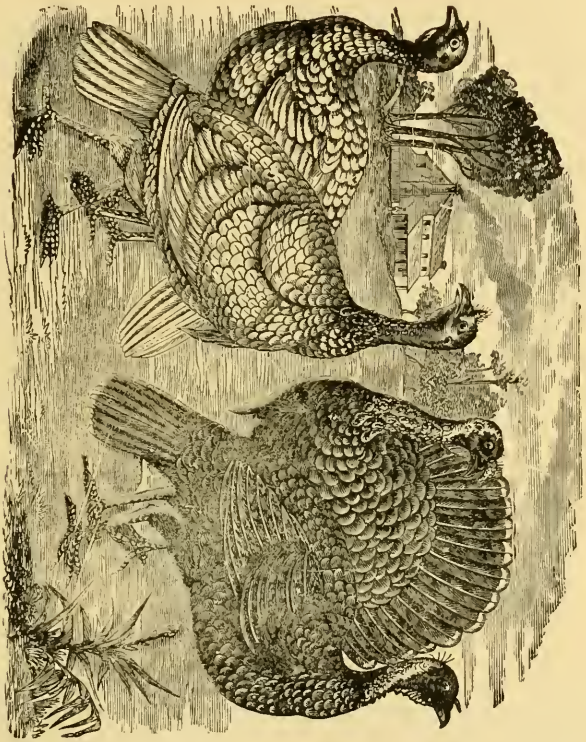
III. The Honduras Turkey.

The Honduras or Ocellated turkey is one of the most elegant of the tribe, and is found all over Central America. It breeds freely with our domestic variety and the progeny is quite fertile. The ground color of the plumage is a beautiful bronzed-green, banded with gold-bronze and shiny black, and lower down the back with deep blue and red. Upon

OCELATED TURKEY HEN

the tail these bands are so well defined and sharp, that they become ocellated or eyed, and hence the name. Unfortunately their southern origin makes them too tender for the North, but in the South there should be little difficulty in breeding them. The Mexican turkey differs

but little from the foregoing. There is more white in the tail feathers and tail coverts, and like the Honduras turkey, it breeds freely with our wild or domestic turkey.



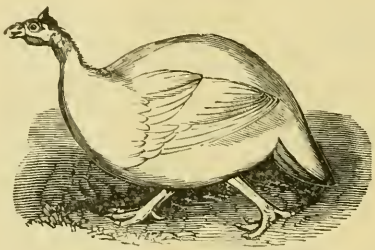
BRONZE TURKEYS.

IV. Bronzed-black Turkey.

This is the largest as it is the best of the domestic turkeys, and was undoubtedly produced by a cross of the wild male upon our common turkey, impressed and fixed by careful breeding and selection, until they will weigh with the best specimens of the wild breed, sometimes attaining a weight of over forty pounds each. The general average, however, is about thirty pounds for mature, well fattened birds, while hens will go

from twenty to twenty-five pounds each. It is the largest as it is the most magnificent in plumage of the domesticated varieties, and as hardy as it is beautiful.

In the cock the face, ear-lobes, wattles and jaws are deep rich red, the wattles warted and sometimes edged white, the bill curved, strong, of a light horn color at the tip and dark at the base. The neck, breast and back black, shaded with bronze, which in the sunlight glistens golden, each feather ending in a narrow glossy black band extending clear across. The under part of the body is similarly marked, but more subdued. The wing-bow is black, showing a brilliant greenish or brown lustre, the flight-feathers black, barred across with white or gray, even and regular; the wing-coverts rich bronze, the end of each feather terminating in a wide black band, giving the wings when folded a broad bronze band across each; tail black, each feather irregularly penciled with a narrow brown band, and ending in a grayish-bronze band. Fluff abundant and soft; legs long, strong, dark or nearly black. The hen is similarly colored, but more subdued.



GUINEA FOWL.

V. Guinea Fowl.

The Guinea fowl is quite widely disseminated, being found in its domesticated or rather half-domesticated state all over Europe and America; yet can hardly be called common. The reason is they are shy and rather inclined to pair as in the case of other wild birds. In domestication one male may be allowed to about six females. They are grouped by some naturalists into a considerable number of varieties, but since the so-called species are all quite fertile together, the distinction is probably merely fanciful. They are found wild in the Cape Verd Islands and in Jamaica, having undoubtedly been carried thence.

The hen will lay about sixty or seventy eggs in a year, though they sometimes reach one hundred. The Pearl guinea fowl is the variety

most usually met with in domestication, the spots being small and white on a purplish-gray ground. Rarely these colors are found reversed. So blue and dun colored birds with but few and even no spots are sometimes seen. There is also a pure white variety, exceedingly rare. The sexes are difficult to distinguish, the colors being so nearly alike. The cock has more wattle, is often more mincing in his gait, as though walking on his toes, and more pugnacious. In fact, their quarrelsome nature and habit of straying has perhaps as much as anything else, prevented their becoming more common.

PEACOCK.

VI The Peacock.

This magnificent bird, as useless as it is beautiful for its tail feathers, and a rarity in the barn-yard, is as hardy as a turkey at maturity, and the young are not difficult to rear. The hen is very secret in stealing her nest in some out-of-the-way place where the male bird may not find it, since, if so, he is pretty sure to destroy the eggs. They do not commence laying until pretty late in the season, and keep their brood out of view until cold weather drives them home for food. The male is much given to wandering, often roaming for miles about the country, his strong pinions and immense tail enabling him to fly long distances.

CHAPTER VI.

DUCKS.

I. ROUEN DUCKS. — II. AYLESBURY DUCKS. — III. CAL. DUCKS. — IV. CAYUGA BLACK DUCKS — V. GRAY DUCKS — VI. BLACK EAST INDIA DUCKS. — SUMMARY

Ducks and geese are becoming more and more fancied from year to year on the farm, as they should properly be. The reason why they have not been more extensively raised than they have, is from the erroneous opinion that a pond or lake is essential to them. They should have a pool of water to wash in; this produced, it is all that is necessary so far as water is concerned; in fact, without water they are more domesticated and less inclined to ramble. All the principal farm breeds of ducks are probably descended from the *Anas boschas*, or wild *Mallard*. Like the wild goose, it is not difficult to domesticate wild ducks. All that is necessary is to get the eggs and rear them under a hen, the eggs hatching in twenty-eight days. There is no farm bird that is a more inveterate insect hunter or more agile than a young duck, one specimen taking fully double per day what chickens will. Hence their value to the farmer, and especially the gardener, is very considerable in addition to their egg and flesh producing qualities. They should be raised more extensively than they are, and on every farm.

I. Rouen Ducks.

Whatever may have been the origin of the name, Rouen, from a town in France, celebrated for its ducks, or roan, from its color, this variety is simply a wild Mallard, improved and enlarged by selection and care in

breeding. The markings as found in the wild variety will very perfectly describe the tame. Good specimens will dress six pounds each, and over; occasionally specimens will weigh nearly eleven pounds, alive. Their

ROUEN DUCKS.

flesh is abundant and of the very best flavor. They scarcely wander at all. In fact, they are so lazy and disinclined to exercise, that if abund-

antly fed they soon become so fat that their abdomens trail on the ground. From their inactivity they are the most easily stolen of any variety. The eggs are laid in great numbers, of a blue-green color, with thick shells, and should average in weight about three and a half ounces.

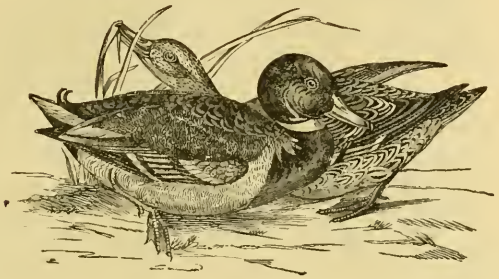
AYLESBURY AND ROUEN DUCKS COMPARED.

II. Aylesbury Ducks.

The Aylesbury duck is without doubt the most valuable of the English breeds, and fully as well appreciated in this country as in England. They hardly reach so great weight as the last mentioned variety, eighteen

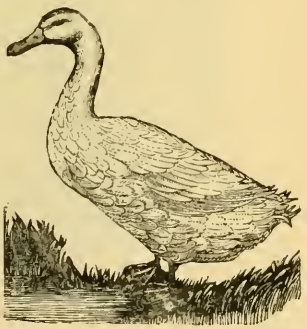
pounds the pair being about the outside figure. They are prolific layers, the eggs of a pure white color, thinner in the shell than those of the Rouen. The ducks are excellent mothers because less unwieldy than the Rouens.

In buying ducks for breeding purposes, and especially the Aylesbury, avoid those that are down behind, from undue stretching of the abdominal muscles; such birds are always sterile, both as to the ducks and drakes.



GRAY CALL DUCKS.

III. Call Ducks.

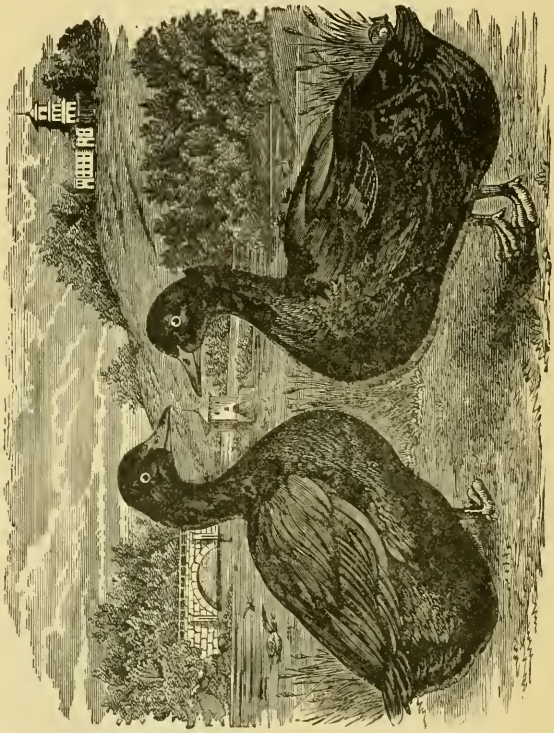


WHITE DUCK.

There are two varieties of small ducks that have the same relation to the large variety, as Bantams have to Barn-yard fowls. One is the Gray Call, the other the White Call duck. The first is an exact counterpart of the Rouen in every respect, even to the legs, feet and bill; the other being in color like the Aylesbury, but differing in the bill, which is a clear yellow, while the Aylesbury is flesh-colored. As fanciful things on a piece of water, they are very pretty, as to either variety. The colored variety is much used as decoy ducks for the wild species, being remarkable for their loud, shrill and continuous quacking note. Hence their name.

IV. Cayuga Black Ducks.

These are the finest of the American breeds, as they are the largest, most valuable and handsomest of the duck tribe. The plumage is a rich metallic black, with lustrous reflections on the head, neck and wings. The bill is blue-black, with a jet black splash in the middle of it.



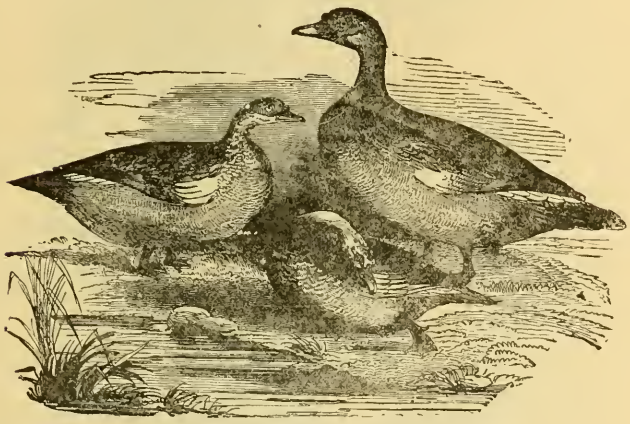
CAYUGA BLACK DUCKS

They have long, straight necks, long, straight head and beak, and in size they are fully equal to the Rouen, often weighing ten pounds each. The flesh is gamy in flavor, and to our taste fully equal to any of the wild species, except the Canvas-back, Widgeon and Teal. They are prolific in eggs, are quiet, mature at an early age, and excepting possibly the Rouen, are the most valuable of all domesticated ducks.

V. Fancy Ducks.

Among the most ornamental of the duck tribes are the Mandarin and the Carolina ducks, both unsurpassed for brilliance of plumage and variety of coloring. The Mandarins are a Chinese variety, and the Carolinas the wild wood duck of the United States, domesticated and improved by careful breeding.

The Muscovy duck is a large breed, and thought to be valuable on this account by some. They are only mentioned here on this account, since their strong flavor of musk should keep them from the tables of all who appreciate fine flavor.



BLACK EAST INDIA DUCK.

VI. Black East India Duck.

The Black East India duck which has appeared from time to time under various foreign names, as Labrador, Buenos Ayrean, and later as Black Brazilians, have little if anything to recommend them in comparison with better and larger breeds. They are undoubtedly a sport of the Mallard, and certainly are among the most beautiful of the small breeds, and are so hardy, and give so little trouble that it accounts probably for their many admirers.

Summary.

Ducks are valuable both for their feathers and flesh, for their aptitude in foraging for themselves, and especially for the great insect eating propensities of the young, they should be raised on every farm. Wild ducks

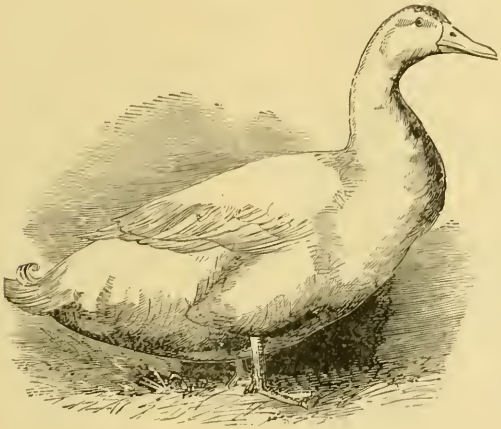
are so numerous in the West that this is probably a reason why they are not more extensively bred there. But wild ducks are in the market for only a comparatively short time in the Spring and Fall, and at all other

CAYUGA DUCKS.

cool seasons ducks may be sold, and are not to be despised on the tables of the farmers.

When flesh is the principal object, and handsome ornamental qualities desired, the Rouen and especially the Black Cayuga will give satisfaction. If white feathers are desired the Aylesbury will be the best variety. As

to the rearing it is extremely simple, they are little liable to disease, and well able to take care of themselves; they must, however, have plenty of water to drink, and a pool to wash and swim in. These being furnished, if hatched under hens, they will give little trouble and fully repay the labor bestowed on them. Their period of incubation is thirty days.



AYLESBURY DRAKE.

Water Fowl

CHAPTER VII.

GEESE.

I. EMBDEN OR BREMEN GEESE. — II. TOULOUSE GEESE. — III. HONG KONG GEESE. — IV. WHITE CHINESE GEESE. — V. THE AFRICAN GEESE. — VI. CANADA WILD GEESE. —MANAGEMENT OF GEESE.

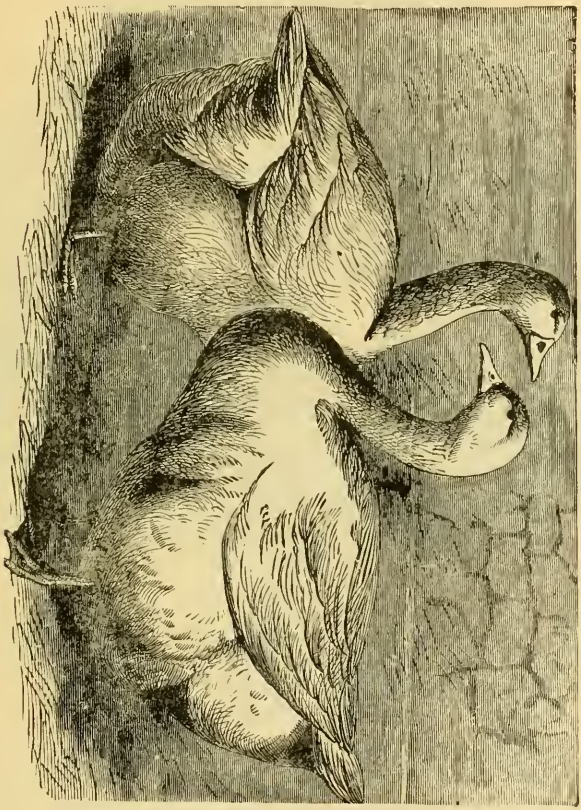
Geese, like the guinea fowl are noisy creatures, and these two birds are nine times out of ten better "watch dogs" than the average cur. The former on the ground, and the latter perched high in a tree, see the smallest object and hear the slightest sound, and giving the alarm the noble watch dog wakes up, barks and gets the credit. There are only a few varieties which we shall notice, but these constitute about all that are valuable of those fowls that "saved Rome."

I. Embden, or Bremen Geese.

These, the most valuable to our mind of the whole tribe, taken for large size, pure white feathers, and aptitude to fatten, are worthy a place on any farm. They are spotless white in color throughout both male and female, full, and erect in carriage, the legs deep orange in color, and the bill dark flesh color, the eyes bright blue. The eggs are white, large, and with rough thick shells. This breed attains enormous weights, often going over thirty pounds, when mature, and the goose over thirty-five pounds. For breeding purposes twenty pounds will be a full weight for the ganders.

II. Toulouse Geese.

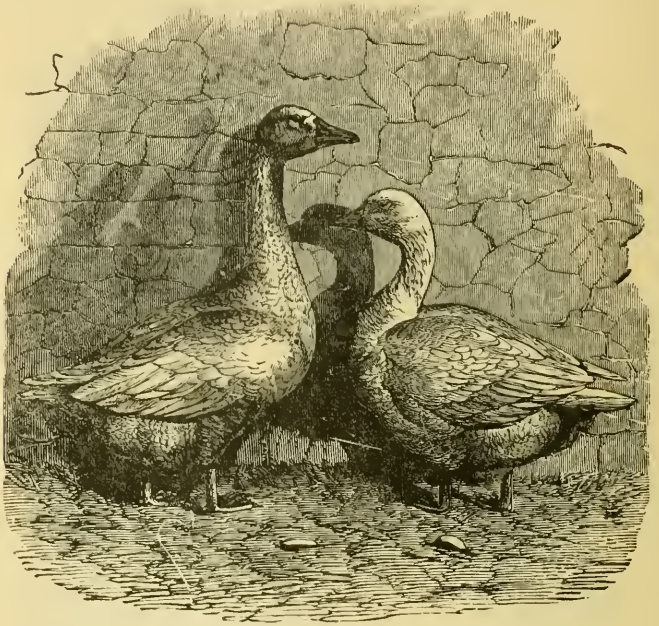
Next in order of practical merit, to our mind, is the Toulouse; these are called after the city of that name in France. They are most compact in body, not so tall as the Bremen, but will often outweigh them. In



EMBDEN GEESE.

color they are light gray as to their bodies and breasts, the neck dark gray, getting gradually darker until it approaches the back, the wings are of the color of the neck, shaded off lighter as it approaches the belly and at length becoming white; the legs and feet are a deep reddish orange,

the bill the same, toned somewhat with brown. Both the Embden and Toulouse may be easily raised under hens, by regularly sprinkling the



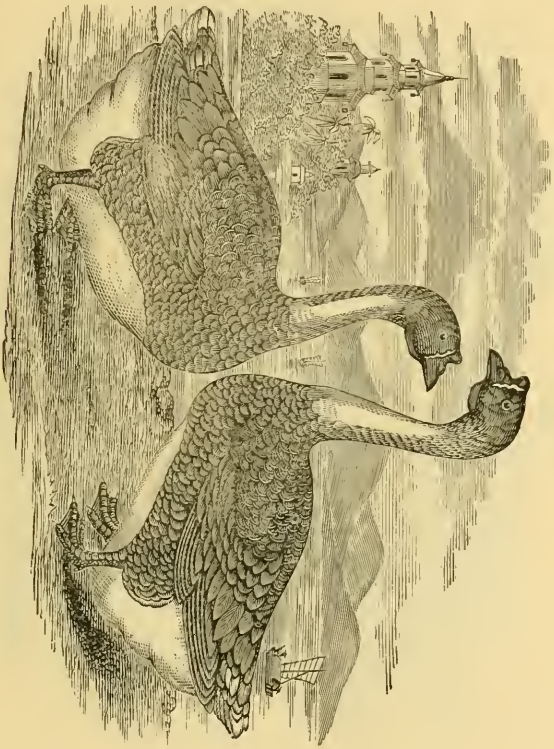
TOULOUSE GEESE.

eggs with blood-warm water, to keep the shells from becoming hard and thus imprisoning the young. This, with even a tub of water set in the ground, and good feeding, will insure success in geese raising.

III. Hong Kong Geese.

The China Hong Kong, or Knobbed goose, so named from the protuberances at the base of the bill, really possesses some of the characteristics of the swan as it does of geese. It is also in size, between a medium sized goose and swan, is highly ornamental in the water, hardy, the most prolific of any in eggs, and the quality of the flesh is superior. It has a harsh, discordant cry, and if allowed full liberty will steal away at night, if water for swimming in be near, or it can find it. This nocturnal habit, however, can be prevented by shutting up at night in a place safe from

foxes or owls, which should be practiced with all geese and ducks. Hong Kong geese vary much in color; they all have the same characteristic protuberances at the bill, and also a distinct stripe down the back of the neck. They should have a dewlap, or feathered wattle under the throat, the bills and legs should be of an orange color, and the protuberances at

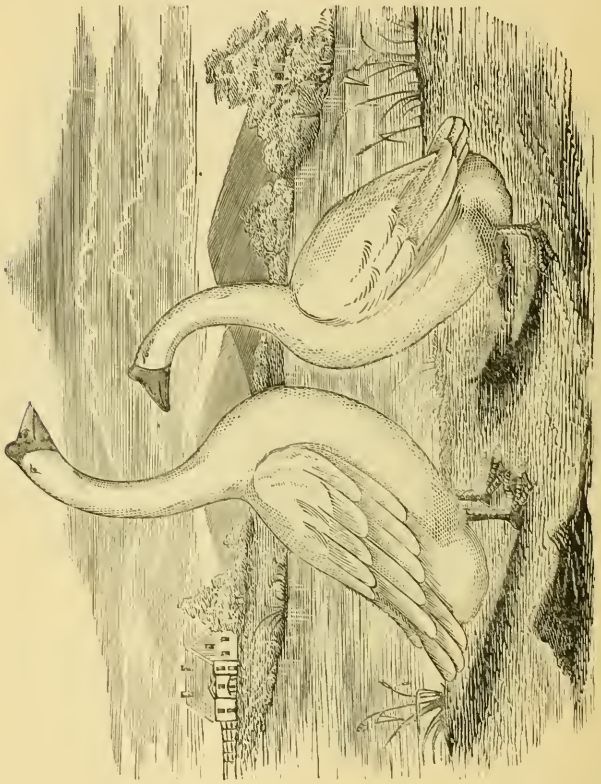


HONG KONG GEESE.

the base of the upper bill, dark, in fact almost black, the most usual color is grayish brown on the back and upper parts, changing to white or whitish gray under the abdomen, the neck and breast yellowish gray, with a distinguishing stripe of dark brown running down the entire back of the neck, from the head to the body.

IV. White Chinese Geese.

The White Chinese geese are of immense size, pure spotless white throughout; the legs bright orange colored, bill the same color and with a large orange colored knob at its base. It is more swan-like than the



WHITE CHINA GEESE.

Hong Kong, of which it is perhaps a variety, and either in or out of the water is a most pleasing object. When swimming, its long, slender neck is gracefully arched, and whether for ornament or use, it is certainly a valuable breed. It is certainly as prolific as its colored relation, laying a large number of rather small eggs in a season, breeding three or four times,

the period of incubation being five weeks. The goslings are easily raised, and are of fine eating quality. A peculiarity of the breed is the disparity in the relative size of the sexes, the males being often one-third heavier than the females.

V. The African Goose.

This immense goose, among the largest of the tribe, is of fine carriage and bulk, carrying its neck upright, and head high, when walking. The head and top of the neck are brown, deep on the upper side and somewhat lighter on the under side; the bill is armed with small indentations

AFRICAN GOOSE.

along the sides, and at the base, on top rises a round, fleshy tubercle, of a bright vermilion color, and under the throat is a hard, firm, fleshy membrane. These birds have also been called Siberian geese, but the name African is undoubtedly the proper one.

VI. Canada Wild Geese.

This excellent goose may be easily hatched from wild eggs, and which upon being domesticated, take kindly to the farm. It is too well known

to need description; when farm-bred it retains much of the game nature of the flesh of the wild bird. Their sagacity is superior to that of any other goose. It has a wide range of flight in its wild state, being found at proper seasons from the Arctic circle to the Torrid zone, and in Europe as well as in America; specimens having been shot in England. It is certainly one of the most beautiful of water fowls. It breeds kindly with any of the common varieties, and is reputed in France to have interbred with swans.

Management.

There is but little care necessary in breeding geese. They require a dry place for passing the night; are subject to but few diseases, and these only when young. For diarrhœa, give a drop or two of laudanum in a little water, to be repeated if the first dose does not cure. For giddiness, bleed them in the prominent vein which separates the claw. Insects sometimes annoy them by getting into the nostrils and ears. It may be known by their hanging wings, and the shaking of their heads. Feed them corn at the bottom of a vessel of water. For fattening, there is nothing better than corn-meal, steamed potatoes and skimmed milk, alternated with ground buckwheat, oat-meal or barley-meal. During the fattening process they should be kept closely confined. When fattening, the French pluck the feathers from the belly. They should be fed three times a day, and supplied with plenty of pure water, and when fat, which should be in two or three weeks from the commencement of feeding, they should be sold immediately, since they at once begin to lose flesh again.

Glossary of Terms Used by Fanciers and Breeders.

Beard.—A bunch of feathers under the throat of some breeds, as Houdans or Polish.

Breed.—Any variety of fowl presenting distinct characteristics.

Brood.—Family of young chickens.

Broody.—Desiring to set.

Carriage.—The attitude or bearing of a bird.

Carunculated.—Covered with fleshy protuberances, as on the neck of a turkey-cock.

Chick.—A newly-hatched fowl, until a few weeks old.

Chicken.—Applied to indefinite ages until twelve months old.

Clutch.—Given to the batch of eggs under a setting hen, also to brood of chickens hatched therefrom.

Cockerel.—A young cock.

Comb.—The red protuberance on top of the fowl's head.

Condition.—The state of the fowl as regards health, beauty of plumage—the latter especially.

Crest.—A tuft of feathers on the head; the top-knot.

Crop.—The receptacle for food before digestion.

Cushion.—The mass of feathers over the tail and end of the hen's back, covering the tail; chiefly developed in Cochins.

Deaf-ears.—Folds of skin hanging from the true ears, varying in color, being blue, white, cream-colored, or red.

Dubbing.—Cutting off the comb, wattles, &c., leaving the head smooth.

Ear-lobes.—Same as deaf-ears.

Face.—The bare skin around the eye.

Flights.—The primary wing feathers, used in flying, but unseen when at rest.

Fluffs.—Soft, downy feathers about the thighs.

Furnished.—Assumed full character. When a cockerel obtains his tail, comb, &c.

Gills.—A term applied to the wattles, sometimes more indefinitely to the whole region of the throat.

Hackles.—The peculiar narrow feathers on the fowl's neck.

Hen-feathered, or *Henny.*—Resembling a hen, in the absence of sickles.

Hock.—The elbow-joint of the leg.

Keel.—A word sometimes used to denote the breast-bone.

Leg.—The scaly part, or shank.

Leg-feathers.—The feathers on the outside of the shank.

Mossy.—Confused in marking.

Pea-comb.—A triple comb.

Penciling.—Small stripes over a feather.

Poult.—A young turkey.

Primaries.—The flight-feathers of the wings, hidden when the wing is closed.

Pullet.—A young hen.

Rooster.—The common term for the male bird.

Saddle.—The posterior of the back, reaching to the tail in a cock, answering to the cushion in a hen.

Secondaries.—The wing quill-feathers, which show when the bird is at rest.

Self-color.—A uniform tint over the feathers.

Shaft.—The stem of a feather.

Shank.—The scaly part of the leg.

Sickles.—The top curved feathers of a cock's tail.

Spangling.—The marking produced by each feather having one large spot of some color different to the ground.

Spur.—The sharp weapon on the heel of a cock.

Stag.—Another term for a young cock.

Strain.—A race of fowls, having acquired an individual character of its own, by being bred for years by one breeder or his successors.

Symmetry.—Perfection of proportion.

Tail-coverts.—The soft, glossy, curved feathers at the sides of the bottom of the tail.

Tail-feathers.—Applied to the straight, stiff feathers of the tail only.

Thighs.—The joint above the shanks.

Top-knot.—Same as crest.

Trio.—A cock and two hens.

Under-color.—The color of the plumage as seen when the surface is lifted.

Vulture-hock.—Stiff projecting feathers at the hock-joint.

Wattles.—The red depending structures at each side of the base of the beak.

Web.—Expressing a flat and thin structure. The web of a feather is the flat or plume portion: the web of the foot, the flat skin between the toes; of the wing, the triangular skin, seen when the member is extended.

Wing-bar.—Any line of dark color across the middle of the wing.

Wing-bow.—The upper or shoulder part of the wing.

Wing-butts.—The corners or ends of the wing. Game fanciers denote the upper ends as shoulder-butts; the lower as lower-butts.

Wing-coverts.—The broad feathers covering the roots of the secondary quills.

PART X.

DISEASES OF POULTRY,

AND THEIR REMEDIES.

CHAPTER I.

DISEASES AND REMEDIES.

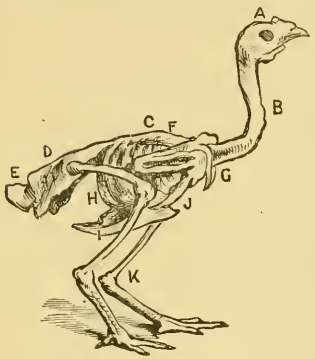
ANATOMY OF THE HEN.——APOPLEXY.——ITS CAUSE.——ROUP.——TO CURE.——EGG BOUND.——INFLAMMATION OF THE EGG PASSAGE.——CHOLERA.——GAPES.——CAUSE.——HOW TO CURE.——CROP BOUND.——DIPHTHERIA, OR CROUP.——LICE.

Diseases of Fowls.

There are but few diseases to which fowls are subject. Some of these, as apoplexy, are so sudden and fatal that there is scarcely time for remedies. Others, as so called chicken cholera, are malignant and infectious, and thus require watching. Others again, inflammatory in their nature, are difficult to understand and hence difficult to treat. The general run of diseases, however, to which the fowls of the farmer and suburban fancier are liable to in his flock are, as a rule, simple in their nature and of easy treatment. We shall, therefore, divide diseases into but two divisions—dangerous and simple ailments. In the first class will be considered those more fatal, and in the second class mere ailments, as leg weakness, bumble foot, catarrh, diarrhea, pip, lice, and other parasites. For a better understanding of the subjects, we introduce figures showing the skeleton of a fowl, their true positions and proper names. It will make a good study in connection with those on plumage, etc.

Anatomy of the Hen.

Explanation.—*A*—The head, length 2 3-4 inches. *B*—The neck, length 5 1-2 inches. *C*—The back or spine. *D*—The hips or hip bones, (the back and hips comprise from the shoulder to the tail,) length 5 9 10 inches. *E* — Rump or coccygis, length 1 1-2 inches. *F*—Shoulder-blade or shoulder. *G*—Collar bone or merry thought. *H*—Chest or thorax, composed of the sides and breast bone (bone of the throat), it contains the heart, liver, etc. *I*—The breast bone, length a little over 3 1-2 inches. *J*—The wing bones, as will be seen, are composed of the humerus or shoulder-bone of the wing, length 3 1-7 inches; also the radius and the cubitus, the forearm or pinion, length 2 3-4 inches; the tip of the wing, or that which takes the place of the hand and fingers, length 2 1-3 inches. *K*—The leg, composed of *d* — (Fig. 2.) the thigh bone, 3 1-7 inches; *e* — the shin bone, length 4 1-3 inches; *f*—the bone of the foot, the tarsus, length 3 1-7 inches; *g*—the claws, that of the middle, length 2 1-3 inches; the two to the right and left, length 1 6-10 inches; that of the back, length 8-10 inches; *h*—the patella or knee; *i*—the os calcis or heel.



ANATOMY OF THE HEN. (Fig. 1).

(Fig. 2.)

The engraving (Fig. 1.) represents the skeleton of an ordinary hen of an average size, and in the proportions to be generally met with. The only important muscles are those which compose the flesh, from which are formed the breast, the thigh, the leg and the wings. All the others are slender and only furnish a little for table use.

People often confound the thigh, the leg, the foot and toes of the hen, and so it is with nearly all animals. One expects to see her walk on the foot, though she walks like them on the toes. It is evident that the tarsus of the hen is the foot she would use on the ground if she walked like man; the end opposite the toes is the heel. Some fowls have five or six toes but they do not all rest on the ground always.

Apoplexy—Its Cause.

Over-feeding and over-stimulating of fowls—seldom occurring on the farm—and generally known by finding the subject dead, often in the

nest. *Prevention* is the proper means to use. Give plenty of exercise and good wholesome food, but not that of an over-stimulating nature. *The cure* is by opening a blood vessel and bleeding freely, selecting the largest of the veins on the underside of the wing. Hold the vein between the opening and the body, and release it when blood enough is taken. Keep the bird quiet and on light diet until recovered.

Roup.

The symptoms are at first those of severe catarrh. The discharge loses its thin, watery, transparent character, gets opaque, with a peculiar and offensive smell. The inner corner of the eye contains froth, the lids swell, stick together and at last close. The nostrils close from the same accumulation; the sides of the face swell and the bird dies. It is a disease of the lining membrane of the nasal cavities.

To Cure.

Provide warm, dry, well-ventilated quarters, stimulating and nutritious food. Give internally a tea or a table-spoonful of castor oil, according to the size of the fowl, syringe the nostrils with chloride of soda, two parts water to one part of chloride. Inject by inserting the syringe in the slit at the roof of the mouth. Three or four hours after the oil give the following:

No. 1.
½ Ounce balsam copaiba,
½ Ounce liquorice powder,
½ Drachm piperine.

Divide into thirty doses, enclose each in a little gelatine, and give a dose twice a day. Isolate the sick fowls from all others, and *kill promptly* if they do not yield to treatment.

Egg Bound.

In this disability the eggs cannot pass down the passage. Strip a tail feather to within an inch of the end; saturate it thoroughly in lard oil or sweet oil, and pass it carefully up the passage to the egg, lubricating the whole. If relief is not given, repeat the process.

Inflammation of the Egg Passage.

Symptoms.—There will be general feverishness, dullness, and the feathers, especially those over the back, will be raised and ruffled. Give the following:

No. 2.
1 Grain calomel,
1-12 Grain tartar emetic.

Mix; envelop in gelatine and place well back on the root of the tongue until swallowed. If relief do not ensue in two days, give another dose.

Cholera.

Symptoms.—There is sudden and great thirst with diarrhœa; the evacuations are greenish, but soon change to a whitish character; cramp ensues and the bird totters, falls, and often dies suddenly. Administer every three hours, until relief is obtained, the following:

No. 3.
5 Grains rhubarb,
2 Grains cayenne pepper,
10 drops laudanum.

Give this at a dose for large fowls, and half this quantity to chickens two months old. Between each dose keep up the strength by giving a tea-spoonful of brandy and water, half and half. This is also good for common diarrhœa, omitting the brandy.

Gapes.

Parasitic worms (*sclerostoma syngamus*) in the windpipe, occurring in chickens up to two or three months of age.

How to Cure.

Separate the chickens affected; strip a small quill feather to within half an inch of the end. Dip in spirits of turpentine; pass it down the small opening of the windpipe, at the base of the tongue: turn it once or twice around and draw it out. If it does not relieve operate again next day. Give a warm, dry place, plenty of good food, and for drink, milk well sprinkled with black pepper. It is supposed that the gape worm is produced by a small parasite insect resembling a tick found on the heads of young chickens. Examine the heads with a pocket lens and if found use the following, lightly rubbed on.

No. 4.
1 Ounce mercurial ointment,
1 Ounce lard oil,
½ Ounce flowers of sulphur,
¼ Ounce crude petroleum.

Mix, and apply just warm enough to be melted. It is said that a case of gapes has never been found in which the young chickens were not first infected with the tick parasite.

Black Rot.

Swelling of the legs and feet, the comb black, resembling mortification. Give a tea-spoonful of castor oil, and then daily, until relieved, half a

tea-spoonful of flowers of sulphur. This is also good in scaly leg, and eruptions of various kinds, using also, after washing clean, the following:

No. 5.
4 Ounces lard oil,
1 Ounce turmeric powder.
Anoint the affected parts.

Catarrh—Symptoms like the first in Roup. Cleanliness is the best prevention. To cure, feed black pepper in mashed potatoes. If this fails, take:

No. 6.
3 Parts pulverized charcoal,
3 Parts new yeast,
2 Parts flowers of sulphur,
1 Part flour.

Mix into pills the size of a hazelnut and give one, three times a day; bathe the nostrils and eyes frequently with tepid milk and water, and keep the fowls otherwise clean.

Crop Bound.

The food sometimes becomes bound and impacted in the crop. The remedy is to make an incision into the crop sufficiently large so the contents may be carefully extracted with a blunt instrument. Close with a stitch, and feed with soft food for two or three days, in which a little gentian and cayenne pepper is mixed.

Diphtheria, or Croup.

It may be known by the cough, raising of the head to breathe, and the offensive smell.

What to do—Strip a feather to within half an inch of the end; wet it and dip in powdered borax, and swab the throat well. Nitrate of silver would be more effective. Give to drink, chloride of potassium one-fourth of an ounce dissolved in a half gallon of water.

Preventive—Cleanliness, good ventilation and care. The rule will apply to roup, catarrh, gapes, pip, and other acute and chronic diseases.

Pip—This is a result of other diseases rather than a disease of itself. Remove the crust at the tip of the tongue and wash with chloride of soda, examine the nostrils for any stoppage, and give a tea-spoonful of castor oil if the fowl be very sick.

Rheumatism—Cause—Exposure to damp and cold winds, and bad roosting places; remove the fowls to comfortable quarters, and feed warm, rather soft, stimulating food.

Laying soft eggs—Give plenty of lime rubbish, burned and broken oyster shells, or bone meal.

Lice.

There should be no excuse for infestment by these parasites. They will sometimes make their appearance on new fowls, and setting hens will sometimes contract them. They are of two kinds: the common hen louse, and minute "hen spider," so-called. The latter very minute and infesting every part of the house, and often the horse stables, if the hens are allowed to run there. To rid the house, take out every movable article and wash thoroughly with carbolic acid and water, or with the ammoniacal water of gas factories, which is cheap. Wash also every portion of the house with the same. Or, fumigate by closing every crevice, and burning in an iron pot containing a burning hot stone, half the size of a man's head, a pound of roll brimstone, keeping the house closed two or three hours. Then wash every part of the house with lime-wash in which a pound of potash has been dissolved to each quart of water used in thinning the wash. Wash also the furniture, nests, perches and all else with the potash solution, one pound to a quart of water. Put back the furniture, place fresh hay in the boxes, plenty of dust baths near, and the lice will leave the fowls and die. In case the stable becomes infested, or other places that may not be fumigated, wash with the potash solution, or the lime-wash, containing one part in twenty of carbolic acid.

BACK OF THE BARN.

APPENDIX.

RACING, OR TURF HORSES.

EARLY HISTORY OF THE ENGLISH BLOOD HORSE. —— HOW HE WAS IMPROVED. —— THE AMERICAN BLOOD HORSE. —— CELEBRATED AMERICAN HORSES. —— HISTORY OF THEIR PERFORMANCES.

The care taken in the breeding and training of horses for the chase and for racing in Great Britain, extends back, according to the best authority, to long before this people were converted to Christianity; in fact, to long before the Christian Era.

Just when and how horses were introduced into Great Britain is not certain, but it seems clear that they were well known there long before the Roman conquest, and that they bred horses not only for domestic purposes but also for war and for racing, seems true, from words in the ancient British language, as *rhediad*, a race; *rheda*, to run—from the Gaulish language *rheda*, a chariot, showing that these words applied to the racing of horses. Hence the inference that horses came by way of Gaul, and that chariot races were anciently one of the pastimes of the people.

The Romans found different vehicles in use in Britain, including the war chariot. Youatt infers that from the cumbrous structure of the car, the hardness of the roads, and the furious manner in which the driving was done, that the ancient British horses must have been not only active, but powerful in a wonderful degree; and he says that Cæsar thought them so valuable that many of them were carried to Rome, where they were much esteemed.

After the evacuation of England by the Romans and its occupation by the Saxons, increased attention was paid to the breeding of English horses, and after the reign of Alfred running horses were brought there

from Germany, yet these should not be understood as meaning racing horses as the term is now used. They are supposed to have been light, speedy horses, adapted to the chase or for the roads, as opposed to the heavy war horse, capable of carrying a man at arms with his armor.

It does not appear that until the time of Charles I. horses were kept exclusively for racing. Yet even before Athelstan's time English horses had come to be prized on the continent, and in Athelstan's reign many Spanish horses were imported, showing clearly that so long ago as this the English were fully alive to the importance of the continued improvement of their horse stock.

William the Conqueror is recorded to have used great pains in improving the horse stock of the country, after the conquest of Great Britain by the Normans, through the introduction of fine horses from Normandy, Flanders and Spain, and according to Beal it would seem that as early as 631 people of rank distinguished themselves by often appearing on horseback, and from which it would be natural to infer that thus early horses were kept for pleasure riding, since saddle horses are known to have been used during the Roman occupation of Britain, and cavalry horses long before the Christian Era.

The first Arab horse would seem to have been imported in the reign of Henry I., an Arab horse having, with his accoutrements, been presented by Alexander I. of Scotland, to the church of St. Andrew.

In the twelfth century a race course was established in London, at what was since called Smithfield, and which was also a horse market.

King John paid great attention to the importation of horses; one hundred chosen Flemish stallions having been imported at a single time. Later it is recorded of Edward II. that he purchased thirty war horses and twelve heavy draft horses.

Edward III., upon the occasion of buying fifty Spanish horses, made application to France and Spain for safe conduct for them, and so important was the horse stock of England considered that the exportation of stallions was forbidden, and this prohibition was continued up to and during the reign of Henry VII.

In the reign of Henry VIII it was decreed that no stallion should be allowed to run at large on any waste or common where animals pastured, if under the height of fifteen hands, and that all foals, fillies or mares likely to breed undersized or inferior animals, should be killed and buried.

All the nobility, gentry and higher orders of the clergy, were compelled by an act to keep a number of horses proportioned to their rank, and even a country parson, whose wife was entitled to wear a French hood or velvet bonnet (no person below a certain rank being allowed to wear such

a hood) was obliged to keep an entire trotting stallion, under a penalty of twenty pounds sterling. So, also, it was made compulsory that every deer park and rural parish should maintain a certain number of full-sized mares and stallions. It is also interesting, as being the first mention made in English history, that Henry VIII. and Charles Brandon, Duke or Suffolk, rode a race in the presence of Queen Catharine, and that in his reign the first annual races on a regular race course were instituted.

H. W. Herbert, in his work, The Horse of America, thus sums up the whole matter in relation to the value of Oriental blood in England, in the time of Oliver Cromwell:

It is now pretty generally admitted that, whether Barb, Turk, Syrian, or Arab of the desert proper, all oriental blood has had its share and influence in reinvigorating the blood of the English thoroughbred, and giving to it those peculiar qualities which cause it, with justice, at this day, to be esteemed the best, completest, and most perfect animal in the world.

In what degree these animals have ministered to our now dominant strain, is by no means to be ascertained; but it is to be noted that most of the early imported foreign stallions were not Eastern Arabs.

During the protectorate, Oliver Cromwell, who, though he was compelled by the necessity of conciliating the absurd prejudices of the Puritans, to forbid racing, was yet an ardent lover of the horse, and an earnest promoter and patron of all that belongs to horsemanship, purchased of Mr. Place, afterwards his stud-master, the celebrated "White Turk"—still recorded as the most beautiful south-eastern horse ever brought into England, and the oldest to which our present strain refers. To him succeeds Villiers, Duke of Buckingham, his Helmsley Turk, and to him Fairfax's—the same great statesman and brave soldier, who fought against Newcastle at Marston—Morocco Barb.

And to these three horses it is that the English race-horse of the old time chiefly owes its purity of blood, if we except the royal mares, specially imported by Charles II., to which it is—mythically, rather than justly—held that all English blood should trace.

Of all succeeding importations, those, which are principally known and referred to, as having notoriously amended our horse—by proof of stock begotten of superior qualities, and victorious on the turf through long generations—but few are true Arabs.

We have, it is true, the Darley Arabian, the Leeds Arabian, Honeywood's White, the Oglethorpe, the Newcome Bay Mountain, the Damascus, Cullen's Brown, the Chestnut, the Lonsdale Bay, Combe's Gray and Bell's Gray Arabians; but what is generally called the Godolphin Arabian, as it seems now to be the prevailing opinion—his origin not being actually

ascertained—was a Barb, not an Arab from Arabia proper. Against these, again, we find Place's White Turk, D'Arcey's Turk, the Yellow Turk, Lister's, or the Straddling Turk, the Byerly Turk, the Selaby Turk, the Acaster Turk; Curwen's Bay Barb, Compton's Barb, the Thoulouse Barb, Layton's Barb Mare, great-great-grandam of Miss Layton; the Royal Mares, which were Barbs from Tangier, and many other Barb horses, not from the Eastern desert, heading the pedigrees of our best horses.

In this connection, I would observe that the very reasons for which the Marquis of Newcastle condemned the Markham Arabian—viz., that when regularly trained he could do nothing against race-horses—on account of which condemnation he has received a sneer or a slur from every writer who has discussed the subject, are those which, at this very moment, prevent prudent breeders from having recourse to oriental blood of any kind.

They cannot run or last against the English horse. They have not the size, the bone, the muscle, the shape, if we except the beautiful head, fine neck, thin withers, long, deep and sloping shoulders, which are the inevitable characteristics of the race. Therefore, all men who breed with an eye to profit,—and howsoever it might have been in the olden times of the Turf, there are few now who have not an eye to it, either as hoping to win on the turf, or to produce salable stock—prefer to put their mares to known English winning horses, proved getters of winners, of unquestioned bottom and stoutness, rather than to try stallions of the desert blood, concerning which nothing is known beyond the attested pedigree, and the visible shapes.

Farther our authority gives a list of all foreign, and the most celebrated native stallions which were used for covering in England in 1730, or just 150 years ago. They are as follows:

FOREIGN STALLIONS IN 1730.

The Alcock Arabian, the Bloody Buttocks Arabian, the Bloody Shouldered Arabian, the Belgrade Turk, the Bethel Arabian, Lord Burlington's Barb, Croft's Egyptian horse, the Cypress Arabian, the Godolphin Arabian, Hall's Arabian, Johnson's Turk, Litton's Arabian, Matthew's Persian, Nottingham's Arabian, Newton's Arabian, Pigott's Turk, the Duke of Devonshire's Arabian, Greyhound, a Barb, Hampton Court grey Barb, Strickland's Arabian, Wynn's Arabian, Dodsworth, a Barb.

NATIVE STALLIONS IN 1730.

Aleppo, Almanzer, Astridge Ball, Bald Galloway, Bartlet's Childers, Basto, Bay Bolton, Blacklegs, Bolton Starling, Bolton Sweepstakes, Cartouch, Chaunter, Childers, Cinnamon, Coneyskins, Councillor, Crab, Doctor, Dunkirk, Easby Snake, Fox, Foxcub, Græme's Champion, Grey

Childers, Grey Crofts, Hampton Court Childers, Harlequin, Hartley's Blind Horse, Hip, Hobgobling, Hutton's Blacklegs, Hutton's Hunter, Jewtrump, Jigg, Lamprey, Leedes, Marricle Oysterfoot, Partner, Royal, Shuffler, Skipjack, Smale's Childers, Sorehcels, Squirrel, Tifter, True-blue, Woodcock, Wyndham.

The importation of racing horses was, without doubt, first made to America in Virginia and Maryland. Already had race-courses been established there previous to 1753, and during the exodus from England, of the Royalists, to the South, it is undoubtedly true that they brought with them descendants of such horses as were covering with success in England. Certain it seems that quite early in the eighteenth century there were a considerable number of thoroughbred horses from the most celebrated English sires. That the perfect record has not come down to us is probably due to the fact that, during the Revolutionary war the records were either lost or destroyed between the shock of contending armies.

Spark was owned by Governor Ogle, of Maryland, previous to Braddock's defeat, having been presented to him by Lord Baltimore, who himself received him as a gift from the then Prince of Wales, father to George III. Spark was a most celebrated horse, and probably one of the first of high distinction brought to America.

Other celebrated horses early imported are said to have been, Wilkes' old Hautboy mare, afterward known as Miss Colville. Governor Ogle also imported Queen Mab, and about 1750 Col. Tasker brought to Maryland the celebrated mare Selima, the progenetrix of much of the mightiest blood of the country. In 1752 he won a sweepstake of 500 pistoles, beating Col. Byrd's renowned Tryall, Col. Taylor's Jenny Cameron, and a mare owned by Col. Cameron.

Nearly about the same time, there were imported into Virginia, Routh's Crab, by old Crab, dam by Counsellor, daughter of Coneyskins, supposed to be in or about 1745. In 1747, Monkey, by the Lonsdale Bay Arabian, dam by Curwen's Bay Barb, daughter of the Byerly Turk and a Royal mare. He was twenty-two years old when imported, but left good stock. In 1748, Roger of the Vale, afterwards known as Jolly Roger, by Roundhead, out of a partner mare, Woodcock, Croft's Bay Barb, Dicky Pierson, out of a Barb mare. Roundhead was by Flying Childers, out of Roxana, dam of Lath and Cade, by the Bald Galloway, out of a daughter to the Acaster Turk. Woodcock was by Merlin, out of a daughter of Brimmer. Dickey Pierson by the Dodsworth Barb out of the Burton Barb mare.

In about 1764, was imported Fearnought, got by Regulus out of Silvertail by Whitenose, grand-dam by Rattle, great grand-dam by the

Darley Arabian, great great grand-dam Old Child mare, by Sir Thomas Gresley's Arabian, great great great grand-dam, Vixen, by Helmsley Turk, out of Dodsworth's dam, a natural Barb. Regulus was by the Godolphin Barb, dam Grey Robinson by the Bald Galloway, grand-dam by Snake out of Old Wilkes' Hautboy mare. Rattle was by Sir H. Harpur's Barb out of a Royal mare. Whitenose was by the Hall Arabian out of dam to Jigg. Thus Fearnought is come of the very highest and purest blood in England, and has left his mark largely on the blood-horse of Virginia. It is said that, before his time, there was little beyond quarter racing in Virginia, that his progeny were of uncommon figure, and first introduced the size and bottom of the English race-horse into America. This must be taken, however, *cum grano salis*, as it is evident from what has been stated in regard to Selima, that four-mile racers were the fashion in Maryland at least fifteen years before that date, and it is only to be understood in the case of second-rate racers, that quarter running was in vogue at this period.

These capital horses were shortly followed by Morton's Traveller, who was probably got by Partner, a grandson of the Byerly Turk, and grandsire of King Herod, dam by the Bloody Buttocks Arabian; grand-dam by Grey-hound, a Barb; g. grand dam by Makeless; g. g. g. dam by Brimmer; g. g. g. g. dam by the White Turk; g. g. g. g. g. dam by Dodsworth, a Barb; g. g. g. g. g. g. dam Laydon Barb mare.

Makeless was by the Oglethorpe Arab out of Trumpet's dam. She was a pure Barb by Dodsworth out of the Layton Barb mare. Brimmer was by the Yellow Turk out of a royal mare.

These were probably the best early horses that were imported into America; and to these, with the mares Selima, Queen Mab, Jenny Cameron, Kitty Fisher, Miss Colville, and a few others of about the same period, may be traced all, or almost all the families of running horses now existing in the United States, in a greater or less degree, and with nearly as much certainty as the English champions of the olden day may be followed up to imported Arab and Barb on both sides.

This being most interesting history, we quote from The Horse of America, to show how much the United States is indebted to the South for the foundation of its mighty racers of the present day, and owing undoubtedly to the great interest the old planters of the South and their descendants have taken in field sports. The record is as follows:

In Virginia, Col. John Tayloe, Messrs. Hoomes, Selden and Johnson; in Maryland, Governors Ogle, Ridgely, Wright, Lloyd and Sprigg, who, as it has been remarked, seemed by their practice to acknowledge that the keeping up of a racing stud was a portion of their gubernatorial duty; and in South Carolina, Messrs. Hampton, Washington, McPher-

son, Alston and Singleton, were as early, and have continued to be as constant and undeviating patrons of the American turf, as have the Queensburys, Rutlands, Wyndhams, Bentincks, Fitzwilliams, and other equally renowned turf names, been supporters of this noble sport on the old English greensward.

From so early a date as that of the ante-revolutionary cracks and champions, such as Celer, Traveller, Yorick, Tryall, Ariel, Partner, Marc Antony, Regulus, Flag of Truce, Goode's Brimmer, Butler's Virginia Nell, Bel Air, Calypso, Gray Diomed, Cincinnatus, Virago, Shark, Black Maria, by Shark, Leviathan, Gallatin, Fairy, Cup-bearer, Collector, Amanda, Ball's Florizel, Post Boy, Oscar, Hickory, Maid of the Oaks, Bond's First Consul, Sir Archy, Potomac, Pacolet, Duroc, Hampton, Tuckahoe, and others, the names of which alone would fill a volume, we can easily bring down in these States—and the others colonized from them, both with men and horses, such as Kentucky, Tennessee, and more recently Alabama—one uninterrupted and stainless succession of noble racers, to the day when the descendants of Sir Archy, that veritable Godolphin Arabian of the Turf of America, began to show upon the course—and when the renown of American Eclipse began to call the attention of the whole world, and of the mother country most of all, whence was derived that transcendent stock, which in all other countries has degenerated, but in this has continued to rival the honors of its remotest ancestry by the performance of American race horses.

As being of value, we give also the history and pedigrees of some of the most celebrated horses of the days succeeding the revolutionary war. They are:

First Medley—Imported into Virginia in 1783, by Gimcrack, dam Arminda by Snap, out of Miss Cleveland by Regulus; g. gr. dam Midge, by a son of Bay Bolton; g. g. gr. dam by Bartlett's Childers; g. g. g. gr. dam by Honeywood's Arabian; g. g. g. g. gr. dam the dam of the two True Blues. Gimcrack was by Cripple, out of Miss Elliott, by Grisewood's Partner, gr dam Celia by Partner, g. gr. dam by Bloody Buttocks, g. g. gr. dam by Greyhound, g. g. g. gr. dam Brocklesby Betty.

Cripple was by the Godolphin Arabian, out of Blossom by Crab, gr. dam by Childers out of Miss Belvoir, by Grantham.

Medley was one of the best sires ever imported into America. He got Atalanta, Bel Air, Boxer, Calypso, Gray Diomed, Gray Medley, Lamplighter, the Opossum Filly, Pandora, Quicksilver, Virginia, and others—racers in a high form, and themselves the getters of racers.

Second Shark—Foaled in 1771, and imported into Virginia by

Marske, out of the Snap mare, gr. dam Wag's dam, by Marlborough, out of a natural Barb mare.

Marske, sire of Eclipse, was by Squirt, dam by Foxcub, gr. dam by Coneyskins, g. gr. dam by Hutton's Gray Barb.

Squirt was by Bartlett's Childers, dam by Snake, gr. dam Hautboy. Marlborough was by the Godolphin Arabian, dam large Hartley mare.

Shark's most distinguished progeny are: Americus, Annette, Black Maria, dam of Lady Lightfoot, Opossum, Shark, Virago, and many others.

Third Diomed—Foaled in 1777. Imported into Virginia 1798. He was by Florizel, dam by Spectator, gr. dam by Blank, g. gr. dam by Childers, g. g. gr. dam Miss Belvoir, by Grantham.

Florizel was by Herod, dam by Cygnet, gr. dam Cartouch, g. gr. dam Ebony by Childers, g. g. gr. dam old Ebony Basto mare.

Herod was by Tartar, out of Cypron, by Blaze, out of Selima, &c. &c.

Diomed is probably the greatest sire of the greatest winner-getters ever brought into this country. Had he got none but Sir Archy, out of imported Castianira—who brought him to America in her belly—that renown alone would have been more than enough; for scarce a recent horse in England, unless it be Pot8o's, has so distinguished himself as a progenitor.

He begot Bolivar, Diana, Dinwiddie, Duroc, Florizel, Gallatin, Gracchus, Hamlintonian, Hampton, Hornet, King Herod, Lady Chesterfield, Madison, Marske, Nettle-top, Peace-maker, Potomac, Primrose, Sir Archy, Top-gallant, Truxton, Virginius, Wonder, and many others. Most of the horses named above were the greatest runners of their day, and the getters of the greatest racers and sires to the present time. Boston, probably the very best horse that ever ran on American soil, was by Timoleon, grandson of Sir Archy, the best son of Diomed; while Fashion, the very best mare that ever ran on this side the water, by her dam, Bonnets of Blue, daughter of Reality, was great-granddaughter of that same noble stallion; and by her grandsire Sir Charles, sire of Bonnets and son of Sir Archy, was also his great-granddaughter, a second time, in the maternal line.

Fourth Gabbriel—Foaled 1790, imported into Virginia, was got by Dorimant, dam Snap mare, gr. dam by Shepherd's Crab, g. gr. dam, Miss Meredith by Cade, g. g. gr. dam Little Hartley mare.

Dorimant was by Otho, dam Babraham mare, gr. dam Chiddy by Hampton Court Arabian, out of the Duke of Somerset's Bald Charlotte.

Otho was by Moses, dam Miss Vernon by Cade, gr. dam by Partner, g. gr. dam Bay Bloody Buttocks, g. g. gr. dam by Greyhound, g. g. g. gr. dam by Makeless, g. g. g. g. gr. dam by Brimmer, g. g. g. g. g. gr.

dam by Place's White Turk, g. g. g. g. g. g. g. gr. dam by Dodsworth, g. g. g. g. g. g. g. gr. dam Layton's violet Barb mare.

Moses was by the Chedworth Foxhunter, dam by the Portland Arabian, gr. dam, the dam of the Duke of Bridgewater's Star, she by Richard's Arabian.

Gabriel was brought into Virginia, and became, like the preceding horses, very famous for splendor of his get and their great performances. He got Oscar, Post Boy, and others. The former of whom, dam by imp. Medley, bred by General Tayloe, is his most celebrated son. He was a good runner, and his blood tells in many of our best modern stallions and mares, especially in the Southern States.

Fifth Bedford—Foaled in 1792, imported into Virginia. He was got by Dungannon, dam Fairy, by Highflyer, gr. dam Fairy Queen by Young Cade, g. gr. dam Routh's Black Eyes by Crab, g. g. gr. dam the Warlock Galloway, g. g. g. gr. dam by the Byerly Turk.

Dungannon was by Eclipse out of Aspasia, by Herod, gr. dam Doris by Blank, g. gr. dam Helen by Spectator, g. g. gr. dam Daphne by the Godolphin Arabian, g. g. g. gr. dam by Fox, g. g. g. g. g. gr. dam by Childers, g. g. g. g. g. g. gr. dam by Makeless, g. g. g. g. g. g. g. gr. dam, Sister to Honeycomb Punch, by the Taffolet Barb.

The year of Bedford's importation is not exactly known. He was a great stallion, and there is hardly a family of horses in the Southern States which do not in some degree, more or less, partake of his blood. He was a singularly formed horse—a rich bay—with a peculiar elevation on his rump, amounting in appearance to an unsightliness, if not to an absolute deformity. This mark, known as the Bedford Hump, he has transmitted to his posterity, and, whatever may have been the original opinion as to its beauty, it has been worn by so many celebrated winners, that it has come of late to be regarded as a foreshadowing of excellence, rather than a deformity. It has been worn by Eclipse, Black Maria, her brother, Shark, Boston, Argyle, and many other horses of great note.

Bedford got; Æolus, Cup-Bearer, Fairy, Lady Bedford, Lottery, Nancy Air, Shylock and others not inferior in repute.

On the first settlement in Tennessee, previous to its admission as a State into the Union, the early settlers began taking with them excellent stock from Virginia and Maryland, and the blood of Janus, Jolly Roger, Morton's Traveller, Pacolet and other worthies of the olden times, still percolates in rich luxuriance through the veins of their noble steeds. It has been always a gallant and a sporting State; and I feel proud and happy—the rather that the history of the blood stock of Tennessee and of the neighboring State of Kentucky is nearly identical—to be allowed the opportunity of presenting to my readers a most valuable memoir of

the blood of its best equine families, considerately and kindly compiled for me from his own memoranda of old times, and from personal recollection of events, even before General Jackson and his contemporaries were on the turf, by a veteran turfman and a hereditary breeder, Mr. William Williams—to whom I take this occasion of tendering my most grateful and respectful thanks.

Race Horses at the North.

Prior to the Revolution there was a course for racing, near New York, about the centre of the county, called Newmarket, and one at Jamaica called Beaver Pond. As early as the year 1800 courses were established at Albany, Poughkeepsie and Harlem, New York. On these tracks purses of from one to four miles were contended for. In 1804 an organization was formed extending for five years. The Newmarket course was remodeled, and regular races were held in May and October of each year, at which purses were contended for at four, three and two mile heats.

Among the celebrated horses of that time, some of which have left their impress to this day, were Tippoo Sultan, Hambletonian, Miller's Damsel and Empress. Among these, as worthy of especial mention, were Hambletonian, as the progenitor of mighty trotting stock, Miller's Damsel as the dam of American Eclipse, and Ariel, whose granddam was this gray mare Empress. American Eclipse was the king of the American turf of his day, and Ariel may certainly be said to have been the queen, since out of fifty-seven races she was forty-two times the winner, seventeen of them having been four mile heats. They both of them may be said to rank with the best race horses of any age or country.

The pedigree of Eclipse may be summed up in the language of Frank Forrester, as follows: American Eclipse, bred by Gen. Coles of L. I., foaled 1814; was got by Duroc, his dam the famed race mare Miller's Damsel, by imported Messenger, out of the imported Pot8os mare; her dam by Gimcrack. Duroc, bred by Wade Mosely, Esq., of Powhatan county, Virginia, foaled 1809: was got by imported Diomed, out of Mr. Mosely's "extraordinary race mare Amanda," by Col. Tayloe's famed gray Diomed, son of imported Medley. Thus far Eclipse's pedigree is unquestioned: for the balance see American Turf Register, p. 50, vol. 4. Of Sir Charles Bunbury's Diomed, imported into Virginia 1799, having filled the measure of his glory," nothing more need be said. Messenger, foaled 1788, imported about 1800 into Pennsylvania, was also a race horse of repute at Newmarket; he won some good races, and lost but few. He was a gray, of great substance; was got by Mambrino, a very superior stallion, his dam by Turf, son of Matchem, Regulus—Starling—Snap's dam. See English Stud Book, and American Eclipse's pedigree in full, American Turf Register, p. 51, vol. 4.

Of Ariel we find the following: Ariel's pedigree is worthy of her performances. Her own brothers—Lance, a year older than herself, a distinguished runner that beat the famous Trouble, a great match—O'Kelly, that beat Flying Dutchman, Mary Randolph, and others, with such eclat as to bring $5,000—and St. Leger in the great sweepstake in Baltimore, where he was so unaccountably beaten, but has since beat Terror—her own sister Angeline, and half-brother Splendid, by Duroc, that was beaten at three years old, in a produce match, by Col. Johnson,s Medley—are all well known to fame. Her grandam Empress, has also been regarded one of the most renowned race nags and brood mares of the North. October, 1804, at four years old, she very unexpectedly beat the famous First Consul, for the Jockey Club purse, four-mile heats, at Harlem, N. Y. The first race he lost.

Besides combining the three valued crosses of Herod, Matchem, and Eclipse, it will be observed Ariel's pedigree is "richly imbued with the best English blood;" to which she traces almost directly from Childers, Partner, Crab, Snap, Cade, Spark, Othello, Gimcrack, Mambrino, Medley, Pot8os, Messenger, Baronet, Diomed, &c.; besides deriving her decent from the best early importations. No other stock probably partakes so much of the Messenger blood—no less than four crosses: with two, not very remote, from English Eclipse, two from Gimcrack, two from imported Pacolet, and three from imported Spark. Her color sustains her valuable origin—running so much into the Arabian blood.

Black Maria was another of the wonderful performers of the early part of the century, having been bred by Charles Henry Hall, Harlem, N. Y., and foaled June 15, 1826. She was sired by American Eclipse, dam Lady Lightfoot by Sir Archy, gr. dam Black Maria, by imported Shark; g. gr. dam the dam of Ving't un, by Clackfast, a half-brother to Medley, by Gimcrack; g. g. g. dam Burwell's Maria, by Regulus.

Of her dam, Lady Lightfoot, Frank Forrester says she was the most distinguished racer of her day, having won between twenty and thirty races, the majority at four-mile heats, and never having been beaten but once, except in her old age—her eleventh year—and then by Eclipse, on the Union Course. She was bred by the late Col. John Taloe of Va. and was foaled at Mr. Ogle's seat, Bel-air, Md., in June, 1812.

Among the wonderful racers of forty years ago, Boston and Fashion will always be remembered as the two mighty examples of staunch prowess and well-deserved fame.

Boston was foaled in 1833, bred by John Wickham, Esq., Richmond, Va. His sire was the celebrated Timoleon, out of an own sister of Tuckahoe, by Ball's Florizel; her dam by imported Alderman, out of a mare by imported Clackfast; her gr. dam by Symmes' Wildair, &c.

He was a chestnut with white hind feet and a strip in his face, 15 1-2 hands high, rather short limbed, somewhat flat sided, but of immense substance, and his back a prodigy of strength. From 1836 to 1841 he ran thirty-eight times and won thirty-five races, twenty-six of which were four mile heats and seven three mile heats. His winnings were $49,500, and his earnings as a breeding stallion in 1841, $4,200, making a total of $53,700.

Fashion was bred by William Gibbons, Esq., of Madison, N. Y., and was foaled April 26, 1837. Of this mare it is recorded that it would be difficult to sit down over the Stud Book and compile a richer pedigree than hers, and the same remark will apply to Boston. Each is descended from the most eminently distinguished racing families on the side of both sire and dam, that have figured on the Turf for a hundred years. Fashion was got by Mr. Livingston's Imp. Trustee, out of the celebrated Bonnets o' Blue by Sir Charles, and she out of Reality—"the very best race-horse," says Col. Johnson, "I ever saw." Reality was got by Sir Archy, and her pedigree extends back through the imported horses Medley, Sentinel, Janus, Monkey, Silver-Eye and Spanker, to an imported Spanish mare. Trustee, the sire of Fashion, was a distinguished race-horse in England, and sold at 3 yrs. old for 2,000 guineas to the Duke of Cleveland, after running 3d in the race for the Derby of 101 subscribers. He was subsequently imported by Messrs. Ogden, Corbin and Stockton. Trustee was foaled in 1829, and was got by Catton out of Emma, by Whisker, and combines the blood of Hermes, Pipator, and Sir Peter, on his dam's side, with that of Penelope, by Trumpator, and Prunella, by Highflyer, on the side of his sire. Trustee is not a chance horse; in addition to other winners of his family, in 1835, his own brother, Mundig, won the Derby of 128 subscribers.

In her three year old form she won three of the races she ran and lost one, being beaten by Tyler after winning the second heat. In her four year old form she ran and won three races, one at two miles, one at three miles and one at four miles.

Later, the palm of victory rested upon horses bred west of the Alleghanies and south of the Ohio river. Among the celebrated ones were Lexington, got in 1851 by Boston out of Alice Carneal. Lecompte, by Glencoe, out of Reel. Pryor, by Glencoe, out of Gypsy, own sister to Medoc, by American Eclipse.

Still later, and within the last ten years, the laurels of southern bred racers on various tracks in America and England, are too well known to need recapitulation.

As showing English and American views on the speed of race horses of twenty years ago, really the palmy days of the turf, and which con-

tinued up to the late war, Stonehenge, from an English point of view, says:

By an examination of the racing time-tables as recorded of late years, it will be seen that from 13 1-2 to 14 seconds per furlong is the highest rate of speed attained in any of our races, above a mile, and with 8 st. 7 lbs. carried by three-year-old horses. In 1846, Surplice and Cymba won the Derby and Oaks, each running the distance in 2m. 48s., or exactly 14 seconds per furlong. This rate has never since that time been reached; the Flying Dutchman having however, nearly attained it, but failing by two seconds—making his rate 14 seconds and one sixth per furlong. But the most extraordinary three-year-old performance is that of Sir Tatton Sykes over the St. Leger Course, 1 mile, 6 furlongs, and 132 yards in length, which he ran in 3 minutes and 16 seconds, or at a rate of as nearly as possible 13 1-2 seconds per furlong. With an additional year and the same weight, this speed has been slightly exceeded by West Australian, even over a longer course, as at Ascot in 1854, when he defeated Kingston by a head only; running two miles and four furlongs in 4m, and 27s., or as nearly as possible at the rate of 13 1-2 seconds and one-third per furlong. This performance is the best in modern days, considering the weight, the age, and the distance; and it will compare very favorably with the often-quoted exploit of Childers over the Beacon Course in 1721, when, being six years old, he beat Almanzor and Brown Betty, carrying 9 st. 2 lbs., and doing the distance in 6m. 40s., or at the rate of 14 seconds and one-third per furlong. Thus, allowing him his year for the extra mile in the course, and for the 2lbs, which he carried above the Kingston's weight, he was outdone by the latter horse at Ascot by one second per furlong, and likewise by West Australian at the usual allowance for his age. Again; comparing these performances on the English Turf with the recently lauded exploits of the American horses, it will be found that there is no cause for the fear lest our antagonists in the "go-ahead" department should deprive us of our laurels. On the 2d of April, 1855, a time-match was run at New Orleans between Lecomte and Lexington, both four years old, in which the latter, who won, did the four miles, carrying 7 st. 5lbs., in 7m. 19 3-4s., or as nearly as may be, 13 3-4 seconds per furlong. This is considered by the Americans the best time on record, and is undoubtedly a creditable performance; though when the light weight is taken into account, not so near our best English time as would at first sight appear. On the 14th of April, Brown Dick and Arrow ran three miles over the same course in 5m. 28s., or at the rate of 13 seconds and two-thirds per furlong; the former a three-year-old, carrying 6 st. 2 lbs., and the latter five years old, 6 st. 12 lbs. Thus it will appear that Kingston, of the

same age as Arrow, and carrying 9 st. instead of 7 st. 12 lbs., ran 2 1-2 miles at a better rate than Arrow did his 3 miles, by one-third of a second per furlong. And it has been shown that in the year last past, two horses exceeded the greatest performance of the olden times by a second per furlong, and beat the best American time of modern days by one-third of a second per mile. The assertion, therefore, that our present horses are degenerated in their power of staying a distance under weight, is wholly without foundation; since I have shown that, even taking the time of the Childers' performance as the true rate, of which there is some doubt, yet it has recently been beaten very considerably by West Australian and Kingston. Many loose assertions have been made as to the rate of the horse, for one mile in the last century, but there is not the slightest reliance to be placed upon them. That any race-horse ever ran a mile within the minute, is an absurd fiction: and it is out of the question to suppose that if Childers could not beat our modern horses over the Beacon Course, he could beat them a shorter distance. Stoutness was undoubtedly the *forte* of the early race-horses; they were of small size, very wiry and low, and could unquestionably stay a distance, and could race month after month, and year after year, in a way seldom imitated in these days; but that they could in their small compact forms run as fast in a short spin as our modern three-year-olds, is quite a fallacy; and no racing man of any experience would admit it for a moment.

The size and shape of the modern thoroughbred horse are superior to those of olden days, if we may judge by the portraits of them handed down to us by Stubbs, who was by far the most faithful animal painter of the eighteenth century. In elegance of shape we beat the horses of that day very considerably, more especially in the beauty of the head and the formation of the shoulders, which have been much attended to by breeders. In size, also, there has been an immense stride made, the average height of the race-horse having been increased by at least a hand in the last century. This enlargement is, I believe, chiefly due to the Godolphin Arabian, who was the sire of Babraham, the only horse of his time which reached 16 hands, and sire and grandsire of several which were more than 15 hands, much above the average height of horses at that time—as for instance, Fearnought, Genius, Gower, Stallion, Infant, Denmark, Bolton, Cade, Club, Lofty, and Amphion. Indeed it will be found, by an examination of the horses of that time, that out of 130 winners in the middle of the eighteenth century, there were only 18 of the height of 15 hands and upwards, of which 11 were by Godolphin or his sons, three descended from the Darly Arabian, two from the Byerly Turk, and two from other sources. It may therefore be assumed, with some degree of probability, that the increase in size is in great measure

due to the Godolphin, in addition to the extra care and attention which the horse has received during the same time. Nevertheless, all the care and forcing in the world will not increase the size of some breeds; and unless there was this capability of being forced, no amount of attention would have brought the horse to the present average, which may be placed at about 15 hands 3 inches.

In relation to the comparisons of speed between English and American race horses, the *Spirit of the Times*, New York, sums up the matter, and gives a list of the most renowned racers of England and America, which we append:

It will appear, on a critical examination of the subject, that there is not much difference in the powers of the best race-horses for more than a century; a period during which they have been brought, upon both sides of the Atlantic, to the present high state of perfection. Within the last two years have been exhibited faster running in England, by West Australian and Kingston, and in this country, by Lexington and Lecomte, than was ever before known. The two last have run four miles, and four-mile heats, faster, in either case, than has been performed in England. "Stonehenge," who has been well endorsed in England, has shown "the absurd fiction" of "a mile within a minute;" and that there is "not the slightest reliance to be placed upon the many loose assertions" —such as the reported accounts of Childers: and that he and Eclipse were a distance better than any other horses that have appeared, or that they "could beat any other a half-mile in four miles!" On the same authority, it appears that, in the fastest Derby, St. Leger, and Ascot cup races, as won by Surplice, the Flying Dutchman, Sir Tatton Sykes, Don John, and West Australian, the distance varying from one mile and a half to two miles and a half, that the fastest rate, with English weights, has been a little over one minute and forty seconds per mile. We have no authentic report that the mile has been run in England under one minute and forty-two seconds, the time of Henry Perritt at New Orleans. Nominally of the same age, three years old, and with the same weight, 86 lbs., Inheritor, at Liverpool, ran two miles in 3.25; which is at the rate per mile of 1-42 1-2. "Stonehenge," referring to what he considers the best race ever run in England, states that West Australian, four years old, carrying the St. Leger weight, 8 st. 6 lbs.—118 pounds— "defeated Kingston by a head only," the latter five years old, carrying 9 st.—126 pounds—running two and a half miles in 4.27, "or as nearly as possible, 13 1-2 seconds per furlong." "This performance, the best of modern days, considering the weight, the age, and the distance, will compare very favorably with the often quoted exploit of Childers, in 1721, at Newmarket, when six years old, carrying 9 st. 2 lbs.—128 lbs.—

he did the distance, three and a half miles, in 6.40, or at the rate of 14 seconds and one-third per furlong." "Thus allowing Childers his year for the extra mile in the course, and for the two pounds which he carried above Kingston's weight, he, Childers, was outdone by Kingston at Ascot, by one second per furlong, and likewise by West Australian, at the usual allowance for his age." "Kingston, of the same age as Arrow, and carrying 9 st. instead of 6 st. 2 lbs.—100 pounds—ran two and a half miles at a better rate than Arrow, in his race with Brown Dick, did his three miles, by one-third of a second per furlong," But Arrow's was a race of three-mile heats, the second heat in 5.43 1-2. Lexington, nominally four years old, carrying 103 pounds, ran four miles, also at New Orleans, in 7.19 3-4. or, as nearly as may be, 13 3-4 seconds per furlong, at the rate, for four miles, of less than 1.50 per mile.

The often quoted exploit of Eclipse, of England, was that he ran four miles, carrying 168 pounds, in eight minutes.

With these data before them, it is left for others to draw their own deductions of the relative merits of West Australian, Childers, Eclipse, and Lexington, at the distances they ran, varying from two and a half miles to four.

Some among us believe that Lexington and Lecomte were about as fast and as good race-horses as have ever appeared in England. Undoubtedly they could "stay a distance" about as well as any horse that has run anywhere, having run two heats, of four miles, in 7.26, and 7.38, and the third mile of the second heat in 1.47.

It would be difficult to institute a fair comparison between the race-horses of England and America, the systems of racing being so different in the two countries. With the exception of the light weights, adopted by us for convenience, the modes and rules of our turf are nearly the same as they were in England the last century. In England, since that period, the mode of racing has been essentially changed; heavy weights, even for two and three-year-olds, at short distances, rarely beyond two and a half miles; no longer races of heats; the great events being for "baby horses," two and three-year-olds, instead of *horses*, as formerly. They rarely, nowadays, reach maturity in England. Priam, Touchstone, Harkaway, and Rataplan, are to be regarded as exceptions to a rule. Childers and Eclipse were not introduced upon the turf until five years old, an age at which the most distinguished horses rarely run in these days.

The elastic turf and the straighter shape of the English race-courses, better adapt them to speed than our circular "race-tracks," that are wholly denuded of turf. Therefore a fair comparison of English and American race-horses cannot be made by time as the test; one, too, that is not held in as high esteem in England as with us. Time, there, is frequently disregarded.

Rather a long catalogue is here presented of the best race-horses of England and of this country, which might be extended. Those now or lately upon our turf are omitted, as some doubts might be entertained of their comparative merits. Of those furnished, who will agree as to the pre-eminence of any two of them; at least, to place any six above the rest?

MOST RENOWNED ENGLISH AND AMERICAN HORSES.

1715*, Childers; 1718*, Partner; 1748*, Matchem; 1749*, Regulus and Mirza, by the Godolphin Arabian; 1749*, Spectator; 1750*, Snap; 1758*, Herod; 1764*, Eclipse, by Marske; 1771*, Shark, by Marske; 1773*, Pot8os, by Eclipse; ——*, Saltram, by Eclipse; 1777*†, Diomed; 1782†, Trumpator; 1784†, Sir Peter; 1790†, Waxy; 1792†, Hambletonian; 1796†, Sorcerer; 1798†, Eleanor; 1798†, Orville; 1807†, Whalebone; 1816, Sultan; 1822, Camel; 1827†, Priam, by Emilius†; 1831†, Plenipotentiary, by Emilius†; 1831†, Touchstone; ——†, Queen of Trumps; ——†, Bay Middleton; ——†, Flying Dutchman; ——, Harkaway; ——†, Don John; ——†, Sir Tatton Sykes; ——†, West Australian; ——, Kingston; 1801*, Florizel; 1812, Potomac; 1813*, Sir Archy; 1812, Lady Lightfoot, by Sir Archy; 1812, Vanity, by Sir Archy; 1813, Reality, by Sir Archy; 1813*, Timoleon, by Sir Archy; 1814, Virginian, by Sir Archy; 1815, Sir Charles, by Sir Archy; 1820, Bertrand, by Sir Archy; 1801, Maid of the Oaks, by Imported Spread Eagle; 1801, Floretta, by Imported Spread Eagle; 1801, Postboy, by Imported Gabriel; 1801, Oscar, by Imported Gabriel; 1801, Hickory; 1808, Duroc; ——, Sir Solomon; 1814, American Eclipse; 1820, Flirtilla; ——, Monsieur Tonson; ——, Sally Walker; ——, Ariel, by American Eclipse; ——Medoc, by American Eclipse; ——, Fanny, by American Eclipse; ——, Lady Clifden; ——, Doubloon, by Imported Margrave; ——, Blue and Brown Dick, by Imported Margrave; 1833, Boston; 1837, Fashion; 1839, Peytona; ——, Trifle, by Sir Charles; ——, Andrew, by Sir Charles; ——, Wagner, by Sir Charles; ——, Grey Eagle.

Another view of the comparative merits of race-horses that were not contemporaries is presented by time on the *same* course, and with the *same* weight, or the relative weight for age.

It has been shown lately, that on the Charleston Course, at three and four-mile-heats, in the races won by Nina, Highlander, Jefferson Davis, and Frank Allen, nearly the same time has been made; besides the comparison between that of Bertrand and Floride.

*Boston's ancestors. †Derby and St. Leger winners.

On the Union Course, New York, the fastest four-mile heats were as follows:

Fashion, 5 years, 111 lbs., and Boston, 9 years, 126 lbs., 7.32 1-2—7.45.

Tally-ho, 4 years, 104 lbs., and Bostona, 5 years, 111 lbs., 7.33—7.43.

Fashion, aged, 123 lbs., and Peytona, 5 years, 117 lbs., 7.39—7.45.

Eclipse, 9 years, 126 lbs., and Henry, 4 years, 108 lbs., 7.37 1-2—7.49.

Red-Eye, 8 years, 126 lbs., and One-Eyed Joe, 6 years, 117 lbs., 7.52—7.39.

Lady Clifden, 4 years, 101 lbs., and Picton, 3 years, 90 lbs., Picton winning first heat, 7.44—7.43 1-2—7.56 1-2.

Principles of Breeding.

In relation to the principles and practice of breeding for the turf and for general purposes, Stonehenge on British Rural Sports, than whom none could be more competent to advise, and although written from an English stand-point is applicable to any country or conditions. The author, in an essay holds the following:

THE PRINCIPLES AND PRACTICE OF BREEDING FOR THE TURF AND FOR GENERAL PURPOSES.

Before proceeding to enlarge upon the practical management of the breeding stud, it will be well to ascertain what are the known laws of generation in the higher animals.

The union of the sexes is, in all the higher animals, necessary for reproduction; the male and female each taking their respective share.

The office of the male is to secrete the semen in the testes, and emit it into the uterus of the female, where it comes in contact with the ovum of the female—which remains sterile without it.

The female forms the ovum in the ovary, and at regular times, varying in different animals, this descends into the uterus for the purpose of fructification, on receiving the stimulus and addition of the sperm-cell of the semen.

The semen consists of two portions—the *spermatozoa*, which have an automatic power of moving from place to place, by which quality it is believed that the semen is carried to the ovum; and the sperm-cells, which are intended to co-operate with the germ-cell of the ovum in forming the embryo.

The ovum consists of the germ-cell, intended to form part of the embryo,—and the yolk, which nourishes both, until the vessels of the mother take upon themselves the task; or, in oviparous animals, till hatching takes place, and external food is to be obtained. The ovum is

carried down by the contractile power of the fallopian tubes from the ovary to the uterus, and hence it does not require automatic particles like the semen.

The embryo, or young animal, is the result of the contact of the semen with the ovum, immediately after which the sperm-cell of the former is absorbed into the germ-cell of the latter. Upon this a tendency to increase or "grow" is established, and supported at first, by the nutriment contained in the yolk of the ovum, until the embryo has attached itself to the walls of the uterus, from which it afterwards absorbs its nourishment by the intervention of the placenta.

As the male and female each furnish their quota to the formation of the embryo, it is reasonable to expect that each shall be represented in it, which is found to be the case in nature: but as the food of the embryo entirely depends upon the mother, it may be expected that the health of the offspring and its constitutional powers will be more in accordance with her state than with that of the father; yet since the sire furnishes one-half of the original germ, it is not surprising that in externals and general character there is retained a *fac-simile*, to a certain extent of him.

The ovum of mammalia differs from that of birds chiefly in the greater size of the yolk of the latter, because in them this body is intended to support the growth of the embryo from the time of the full formation of the egg until the period of hatching. On the other hand, in mammalia the placenta conveys nourishment from the internal surface of the uterus to the embryo during the whole time which elapses between the entrance of the ovum into the uterus and its birth. This period embraces nearly the whole of the interval between conception and birth, and is called utero-gestation.

In all the mammalia there is a periodical "heat," marked by certain discharges in the female, and sometimes by other remarkable symptoms in the male. In the former it is accompanied in all healthy subjects by the descent of an ovum or ova into the uterus; and in both there is a strong desire for sexual intercourse, which never takes place at other times in them.

The semen retains its fructifying power for some days, if it be contained within the walls of the uterus or vagina, but soon ceases to be fruitful if kept in any other vessel. Hence, although the latter part of the time of heat is the best for the union of the sexes, because then the ovum is ready for the contact with the semen, yet if the semen reaches the uterus first, it will still cause a fruitful impregnation, because it remains there uninjured until the descent of the ovum.

The influence of the male upon the embryo is partly dependent upon the fact that he furnishes a portion of its substance in the shape of the

sperm-cell, but also in great measure upon the effect exerted upon the nervous system of the mother by him. Hence the preponderance of one or other of the parents will, in great measure, depend upon the greater or less strength of nervous system in each. No general law is known by which this can be measured, nor is anything known of the laws which regulate the temperament, bodily or mental power, color or conformation of the resulting offspring.

Acquired qualities are transmitted, whether they belong to the sire or dam, and also both bodily and mental. As bad qualities are quite as easily transmitted as good ones, if not more so, it is necessary to take care that in selecting a male to improve the stock he be free from bad points, as well as furnished with good ones. It is known by experience that the good or bad points of the progenitors of the sire or dam are almost as likely to appear again in the offspring, as those of the immediate parents in whom they are dormant. Hence, in breeding the rule is, that like produces like, or *the likeness of some ancestor*.

The purer or less mixed the breed, the more likely it is to be transmitted unaltered to the offspring. Hence, whichever parent is of the purest blood will be generally more represented in the offspring; but as the male is usually more carefully selected, and of purer blood than the female, it generally follows that he exerts more influence than she does; the reverse being the case when she is of more unmixed blood than the sire.

Breeding "in-and-in" is injurious to mankind, and has always been forbidden by the Divine law, as well as by most human lawgivers. On the other hand, it prevails extensively in a state of nature with all gregarious animals, among whom the strongest male retains his daughters and granddaughters until deprived of his harem by younger and stronger rivals. Hence, in those of our domestic animals which are naturally gregarious, it is reasonable to conclude that breeding "in-and-in" is not prejudicial, because it is in conformity with their natural instincts, if not carried farther by art, than nature teaches by her example. Now, in nature we find about two consecutive crosses of the same blood is the usual extent to which it is carried, as the life of the animal is the limit; and it is a remarkable fact that in practice a conclusion has been arrived at, which exactly coincides with these natural laws. "Once in and once out," is the rule for breeding given by Mr. Smith in his work on the breeding for the turf; but twice in will be found to be more in accordance with the practice of our most successful breeders.

The influence of the first impregnation seems to extend to the subsequent ones; this has been proved by several experiments, and is especially marked in the equine genus. In the series of examples preserved

in the Museum of the College of Surgeons, the markings of the male quagga, when united with the ordinary mare, are continued clearly for three generations beyond the one in which the quagga was the actual sire; and they are so clear as to leave the question settled without a doubt.

When some of the elements, of which an individual sire is composed are in accordance with others making up those of the dam, they coalesce in such a kindred way as to make what is called "a hit." On the other hand, when they are too incongruous, an animal is the result wholly unfitted for the task he is intended to perform.

IN-AND-IN BREEDING.

By a careful examination of the pedigrees of our most remarkable horses, it will be seen that in all cases there is some in-breeding; and in the greater part of the most successful a very considerable infusion of it. It is difficult to say what is not to be considered such, or when to make it commence, for in all cases there is more or less relationship between the sire and dam of every thoroughbred horse; at least, I cannot find a single exception—and again, for instance, examining the pedigree of Harkaway, which is the result of one of the most direct crosses in the Stud-book, we find that his sire and dam are both descended from Eclipse and Herod through three or four strains on each side, as will be seen by referring to page 921. The same will apply to Alarm, who also is the result of as direct a cross as is often seen; and, in fact, whatever pedigree is analyzed, the result will be that the bulk of it in the fifth or sixth remove is made up of Eclipse, Herod, and Matchem, or Regulus blood. It is not that a horse goes back to one of these stallions in one line only, but through six or seven, and sometimes through nearly all his progenitors. Hence, it may be fairly assumed that all the horses of the present day are related, either closely or distantly; but when we speak of in-and-in breeding, we mean a nearer relationship than this, such as a first cousin, or, at the most, one in the second or third degree. But I believe it will be found that even this amount of relationship is desirable, if not carried too far, and that a vast number of our best modern horses have been bred in this way.

OUT-CROSSING.

By crossing the blood, we understand the selection of a sire composed of wholly different blood from that of the dam, or as different as can be obtained of such quality as is suitable to the particular purpose in view. Thus, in breeding race-horses it is found that continuing in the same strain beyond two stages deteriorates the constitutional health, diminishes the bone, and lowers the height; hence, it is important to avoid this evil, and another strain must be selected which shall lead to

the same results as were previously in existence, without the above deterioration; and this is called out-crossing, or more commonly, crossing. The great difficulty is to obtain this object without destroying that harmony of proportions, and due subordination of one part to another which is necessary for the race,horse, and without which he seldom attains high speed. Almost every individual breed has peculiar characteristics, and so long as the sire and dam are both in possession of them they will continue to reappear in the produce; but if a dam possessing them is put to a horse of different character, the result is often that the produce is not a medium between the two, but is in its anterior parts like its dam, and in its posterior resembling its sire, or *vice versa*, than which no more unfortunate result can occur. Thus, we will suppose that a very strong muscular horse is put to a very light racing mare; instead of the produce being moderately stout all over, he will often be very stout and strong behind, and very light and weak before, and as a consequence his hind-quarters will tire his fore limbs, by giving them more to do than they have the power of accomplishing. This is well seen in Crucifix, who was a very wiry and fast, but light mare, with a fore-quarter hardly capable of doing the work of her own hind-quarter. Now, she has several times been put to Touchstone—a horse remarkable for getting bad-shouldered stock, but with strong muscular propellers—and, with the solitary exception of Surplice, these have been a series of failures. Surplice was also defective in the same way, but still he managed to get along in an awkward style, but somehow or other at a great pace. Cowl, on the other hand, was a better galloper, because there was a greater harmony of parts; but he was somewhat deficient in the stout qualities which Touchstone was intended to supply; yet he will prove, I fancy, a better stallion than Surplice, because he is more truly made, and by consequence more likely to perpetuate his own likeness.

COMPARISON OF IN-BRED AND CROSSED STALLIONS.

The following list of thirty of the most immediately successful stallions of late years shows the proportion of in-bred to crossed horses of this class to be equal. I have omitted such as only became celebrated through their daughters as brood-mares, for instance, Defence, etc.

IN-BRED STALLIONS.

1. Priam. 2. Bay Middleton. 3. Melbourne. 4. Cotherstone. 5. Pyrrhus I. 6. The Baron. 7. Orlando. 8. Ithuriel. 9. Cowl. 10. The Saddler. 11. Sweetmeat. 12. Chatham. 13. Flying Dutchman. 14. Sir Tatton Sykes. 15. Chanticleer.

CROSSED STALLIONS.

1. Partisan. 2. Emilius. 3. Touchstone. 4. Birdcatcher. 5. Sir Hercules. 6. Voltaire. 7. Plenipotentiary. 8. Pantaloon. 9. Lancrcost. 10. Venison. 11. Alarm. 12. Ion. 13. Harkaway. 14. Velocipede. 15. Hetman Platoff.

SELECTION OF BROOD MARE.

In choosing the brood mare, four things must be considered—first, her blood; secondly, her frame; thirdly, her state of health; and fourthly, her temper.

Her blood or breeding will mainly depend upon the views of the breeder—that is to say, what particular class of colts he wishes to obtain, and according to his decision he will look out for mares of the particular kind he desires to reproduce, on the principle that "like begets like," but subject to the various considerations partly alluded to in the last chapter, and partly in this and subsequent ones.

In frame, the mare should be so formed as to be capable of carrying and well nourishing her offspring; that is, she should be what is called "roomy." There is a formation of the hips which is particularly unfit for breeding purposes, and yet which is sometimes carefully selected, because it is considered elegant; this is the level and straight hip, in which the tail is set on very high, and the end of the haunch-bone is nearly on a level with the projection of the hip-bone. The opposite form is represented in the skeleton given with the article "Horse," which is that of a thoroughbred mare, well formed for this breeding purpose, but in other respects rather too slight. By examining her pelvis, it will be seen that the haunch-bone forms a considerable angle with the sacrum, and that, as a consequence, there is plenty of room, not only for carrying the foal, but for allowing it to pass into the world. Both of these points are important, the former evidently so, and the latter no less so on consideration, because if the foal is injured in the birth, either of necessity, or from ignorance or carelessness, it will often fail to recover its powers, and will remain permanently injured. The pelvis, then, should be wide and deep—that is to say, it should be large and roomy: and there should also be a little more than the average length from the hip to the shoulder, so as to give plenty of bed for the foal; as well as a good depth of back-ribs, which are necessary in order to support this increased length. This gives the whole framework of the trunk of a larger proportion than is always desirable in the race-horse, which may be easily overtopped; and hence many good runners have failed as brood mares, whilst a great number of bad runners have been dams of good race-horses. Beyond this roomy frame, necessary as the egg shell of the foal, the mare only

requires such a shape and make as is well adapted for the particular purpose she is intended for; or if not possessing it herself, she should belong to a family having it. If one can be obtained with these requisites in her own person, so much the more likely will she be to produce race-horses; but if not all, then it is better that she should add as many as possible to the needful framework, without which her office can hardly be well carried out. But with this suitable frame, if she belongs to a family which, as a rule, possesses all the attributes of a race-horse, she may be relied on with some degree of certainty, even though she herself should fail in some of them. Thus, there are many fine roomy mares which have been useless as race-horses from being deficient in the power of some one quarter, either behind or before, or perhaps a little too slack in the loin for their length. Such animals, if of good running families, should not be despised: and many such have stood their owners in good stead. On the other hand, some good-looking animals have never thrown good stock, because they were only exceptional cases, and their families were of bad running blood on all or most sides. No mare could look much more unlike producing *strong* stock than Pocahontas, but being of a family which numbers Selim, Bacchante, Tramp, Web, Orville, Eleanor, and Marmion among its eight members in the third remove, it can scarcely occasion surprise that she should respond to the call of the Baron by producing a Stockwell and a Rataplan.

In health, the brood mare should be as near perfection as the artificial state of this animal will allow; at all events, it is the most important point of all, and in every case the mare should be very carefully examined, with a view to discover what deviations from a natural state have been entailed upon her by her own labors, and what she has inherited from her ancestors. Independently of the consequence of accidents, all deviations from a state of health in the mare may be considered as more or less transmitted to her, because in a thoroughly sound constitution, no ordinary treatment such as training consists of will produce disease, and it is only hereditary predispositions which, under this process, entails its appearance. Still there are positive, comparative, and superlative degrees of objectionable diseases incidental to the brood mare, which should be accepted or refused accordingly. All accidental defect, such as broken knees, dislocated hips, or even "breaks down," may be passed over; the latter, however, only when the stock from which the mare is descended are famous for standing their work without this frailty of sinew and ligament. Spavins, ring-bones, large splints, side-bones, and, in fact, all bony enlargements, are constitutional defects, and will be almost sure to be perpetuated, more or less, according to the degree in which

they exist in the particular case. Curby hocks are also hereditary, and should be avoided; though many a one much bent at the junction of the *os calcis* with the *astragalus* is not at all liable to curbs. It is the defective condition of the ligaments there, not the angular junction, which leads to curbs; and the breeder should carefully investigate the individual case before accepting or rejecting a mare with suspicious hocks. Bad feet, whether from contraction or from too flat and thin a sole, should also be avoided; but when they have obviously arisen from bad shoeing, the defect may be passed over.

Such are the chief varieties of unsoundness in the legs which require circumspection; the good points which, on the other hand, are to be looked for, are those considered desirable in all horses that are subjected to the shocks of the gallop. Calf knees are generally bad in the race horse, and are very apt to be transmitted, whilst the opposite form is also perpetuated, but is not nearly so disadvantageous. Such are the general considerations bearing upon soundness of limb.

That of the wind is no less important. Broken-winded mares seldom breed, and they are therefore out of the question, if for no other reason; but no one would risk the recurrence of this disease, even if he could get such a mare stinted. Roaring is a much-vexed question, which is by no means theoretically settled among our chief veterinary authorities, nor practically by our breeders. Every year, however, it becomes more frequent and important, and the risk of reproduction is too great for any person wilfully to run by breeding from a roarer. As far as I can learn, it appears to be much more hereditary on the side of the mare than on that of the horse; and not even the offer of a Virago should tempt me to use her as a brood mare. There are so many different conditions which produce what is called "roaring," that it is difficult to form any opinion which shall apply to all cases. In some instances, where it has arisen from neglected strangles, or from a simple inflammation of the larynx, the result of cold, it will probably never reappear; but when the genuine ideopathic roaring has made its appearance, apparently depending upon a disease of the nerves of the larynx, it is ten to one that the produce will suffer in the same way.

Blindness, again, may or may not be hereditary; but in all cases it should be viewed with suspicion as great as that due to roaring. Simple cataract without inflammation undoubtedly runs in families; and when a horse or mare has both eyes suffering from this disease, without any other derangement of the eye, I should eschew them carefully. When blindness is the result of violent inflammation brought on by bad management or by influenza, or any other similar cause, the eye itself is more or less

disorganized; and though this itself is objectionable, as showing a weakness of the organ, it is not so bad as the regular cataract.

Such are the chief absolute defects, or deviations from health in the mare; to which may be added a general delicacy of constitution, which can only be guessed from the amount of flesh which she carries while suckling or on poor "keep," or from her appearance on examination by an experienced hand, using his eyes as well. The firm, full muscle, the bright and lively eye, the healthy-looking coat at all seasons, rough though it may be in winter, proclaim the hardiness of constitution which is wanted, but which often coexists with infirm legs and feet. Indeed, sometimes the very best-topped animals have the worst legs and feet, chiefly owing to the extra weight they and their ancestors also have had to carry. Crib-biting is sometimes a habit acquired from idleness, as also is wind-sucking; but if not caused by indigestion, it often leads to it, and is very commonly caught by the offspring. It is true that it may be prevented by a strap; but it is not a desirable accomplishment in the mare, though of less importance than those to which I have already alluded, if not accompanied by absolute loss of health, as indicated by emaciation, or the state of the skin.

Lastly, the temper is of the utmost importance, by which must be understood not that gentleness at grass which may lead the breeder's family to pet the mare, but such a temper as will serve for the purposes of her rider, and will answer to the stimulus of the voice, whip or spur. A craven or a rogue is not to be thought of as the "mother of a family;" and if a mare belongs to a breed which is remarkable for refusing to answer the call of the rider, she should be consigned to any task rather than the stud-farm. Neither should a mare be used for this purpose which had been too irritable to train, unless she happened to be an exceptional case; but if of an irritable family, she would be worse even than a roarer, or a blind one. These are defects which are apparent in the colt or filly, but the irritability which interferes with training often leads to the expenditure of large sums on the faith of private trials, which are lost from the failure in public, owing to this defect of nervous system.

CHOICE OF STALLION.

Like the brood mare, the stallion requires several essentials—commencing also like her, first, with his blood; secondly, his individual shape; thirdly, his health; and, fourthly, his temper. But there is this difficulty in selecting the stallion, that he must not only be suitable *per se*, but he must also be adapted to the particular mare which he is to "serve." Thus, it will be manifest that the task is more difficult than the fixing upon a brood mare, because (leaving out of considerations all other

points but blood) in the one case, a mare only has to be chosen which is of good blood for racing purposes, while in the other there must be the same attention paid to this particular, and also to the stallion's suitability to the mare, or to "hit" with her blood. Hence, all the various theories connected with generation must be investigated, in order to do justice to the subject; and the breeder must make up his mind whether in-and-in-breeding, as a rule, is desirable or otherwise; and if so, whether it is adapted to the particular case he is considering. Most men make up their minds one way or the other on this subject, and act accordingly, in which decision much depends upon the prevailing fashion. The rock upon which most men split is a bigoted favoritism for some particular horse; thus, one man puts all his mares to Orlando; another, to Surplice or the Flying Dutchman; although they may every one be different in blood and form to the others. Now, this cannot possibly be right if there is any principle whatever in breeding; and however good a horse may be, he cannot be suited to all mares. Some, again, will say that any horse will do, and that all is a lottery; but I think I shall be able to show that there is some science required to enable the breeder to draw many prizes. That the system generally followed of late is a bad one, I am satisfied, and with constant crossing and re-crossing it is almost a lottery; but upon proper principles, and with careful management, I am tempted to believe that there would be fewer blanks than at present. I have already given my own theoretical views upon the case, illustrated by numerous examples on both sides of the question. It will now be my object to apply these views practically by selecting particular instances.

In choosing the particular blood which will suit any given mare, my impression always would be, that it is desirable to fix upon the best strain in her pedigree, if not already twice bred in-and-in, and then to put to her the best stallion available of that blood. In some cases, of course, it will happen that the second best strain will answer better, because there happens to be a better horse of that blood to be had than of the superior strain, which would otherwise be preferred. If, on the other hand, the mare has already been in-bred to the extent of two degrees, then a cross will be advisable; but I am much inclined to believe, from the success of certain well-known cases, that even then a cross into blood already existing in the mare, but not recently in-bred nor used more than once, will sometimes answer. Upon these principles I should, therefore, look for success. It is surprising to me that this very common occurrence of in-breeding among our best modern horses has so generally escaped observation, and the only way in which I can explain it is by supposing, that having frequently been through the grandam on either

side it has been lost sight of, because the knowledge of the sire's and grandsire's blood is generally the extent to which the inquiry goes. Thus, we find the most recent writer on the subject, who assumes the name of "Craven," asserting, at page 121 of "The Horse"—"There is no proximity of relationship in the genealogy of the Flying Dutchman, Touchstone, Melbourne, Epirus, Alarm, Bay Middleton, Hero, Orlando, Irish Birdcatcher, Cossack, Harkaway, Tearaway, Lothario, or others of celebrity." Now, of these the Flying Dutchman is the produce of second cousins; Bay Middleton, his sire, being also in-bred to Williamson's Ditto and Walton, own brothers; and Orlando, containing in his pedigree Selim twice over, and Castrel, his brother, in addition. Melbourne also is the produce of third cousins, both his sire and dam being descended from Highflyer. But if to these four, which he has specially named, be added the numerous "others of celebrity" to which I have drawn attention, besides a host of lesser stars too numerous to mention, it will be admitted that he assumes for granted the exact opposite of what is really the case.

The choice of particular stallions, as dependent upon their formation, is not less difficult than that of the mare, and it must be guided by nearly the same principles, except that there is no occasion for any framework especially calculated for nourishing and containing the fœtus, as in her case. As far as possible, the horse should be the counterpart of what is desired in the produce, though sometimes it may be necessary to select an animal of a breed slightly exaggerating the peculiarity which is sought for, especially when that is not connected with the preponderance of fore or hind-quarters. Thus, if the mare is very leggy, a more than usually short-legged horse may be selected, or if her neck is too short or too long, an animal with this organ particularly long, or the reverse as the case may be, should be sought out. But in all cases it is dangerous to attempt too sudden alteration with regard to size, as the effort will generally end in a colt without a due proportion of parts, and therefore more or less awkward and unwieldly.

In constitution and general health, the same remarks exactly apply to the horse as the mare. All hereditary diseases are to be avoided as far as possible, though few horses are to be met with entirely free from all kinds of unsoundness, some the effects of severe training, and others resulting from actual disease, occurring from other causes. With regard to fatness, there is an extraordinary desire for horses absolutely loaded with fat, just as there formerly was for overfed oxen at Christmas. It is quite true that the presence of a moderate quantity of fat is a sign of a good constitution, but, like all other good qualities, it may be carried to excess, so as to produce disease; and just as there often is hypertro-

phy, or excess of nourishment of the heart, or any bony parts, so is there often a like superabundance of fat causing obstruction to the due performance of the animal functions, and often ending in premature death. This is in great measure owing to want of exercise, but also to over-stimulating food; and the breeder who wishes his horse to last, and also to get good stock, should take especial care that he has enough of the one and not too much of the other.

In temper, also, there is no more to be added to what I have said relating to the mare, except that there are more bad-tempered stallions to be met with than mares, independently of their running, and this is caused by the constant state of unnatural excitement in which they are kept. This kind of vice is, however, not of so much importance, as it does not affect the running of the stock, and solely interferes with their stable management.

BEST AGE TO BREED FROM.

It is commonly supposed that one or other of the parents should be of mature age, and that if both are very young, or very old, the produce will be decrepit or weakly. A great many of our best horses have been out of old mares, or by old horses—as, for instance, Priam out of Cressida, at twenty; Crucifix, out of Octaviana, at twenty-two; and Lottery and Brutandorf, out of Mandane, at twenty and twenty-one; Voltaire got Voltigeur at twenty-one; Bay Middleton was the sire of Andover at eighteen, and Touchstone got Newminster at seventeen. On the other hand, many young stallions and mares have succeeded well, and in numberless instances the first foal of a mare has been the best she ever produced. In the olden times, Mark Antony and Conductor were the first foals of their dams; and more recently, Shuttle Pope, Filho da Puta, Sultan, Pericles, Oiseau, Doctor Syntax, Manfred and Pantaloon, have all been first-born. Still these are exceptions, and the great bulk of superior horses are produced later in the series. The youngest dam which I ever heard of was Monstrosity, foaled in 1838, who produced Ugly Buck at three years old, having been put to Venison when only two years of age. Her dam, also, was only one year older when she was foaled; and Venison himself was quite a young stallion, being only seven years old when he got Ugly Buck; so that, altogether, the last mentioned horse was a remarkable instance of successful breeding from young parents. As in most cases of the kind, however, his early promises were not carried out, and he showed far better as a two-year-old, and early in the following year, than in his maturity. Such is often the case, and, I believe, is a very general rule in breeding all animals, whether horses, dogs, or cattle. The general practice in breeding is to use young stal-

lions with old mares, and to put young mares to old stallions; and such appears to be the best plan, judging from theory as well as practice.

BEST TIME FOR BREEDING.

For all racing purposes, an early foal is important, because the age takes date from the 1st of January. The mare, therefore, should be put to the horse in February, so as to foal as soon after January 1st as possible. As, however, many mares foal a little before the end of the eleventh month, it is not safe to send her to the horse before the middle of the second month in the year. For further particulars, see "Thoughts on Breeding," and the "Stud-Farm," in which the general management of the mare and foal is fully detailed.

It will be interesting that the reader have a pretty complete record of the best time at various distances in racing. Such a record has been carefully compiled for *Turf, Field and Farm* up to the close of the season of 1879; and which we append:

Fastest and Best Time, and Most Creditable Performances on Record, at all Distances, to end of Year 1879.

HALF A MILE.

Olitipa, by imp. Leamington, Saratoga, July 25, 1874, 0:47 3-4.
Pomeroy, by Planet, Louisville, Ky., May 23, 1877, 0:49 1-4.
Harold, by imp. Leamington, Saratoga, July 23, 1878, 0:49 1-4.
Idalia, by imp. Glenelg, Jerome Park, June 8, 1876, 0:49 1-2.
Leona, by War Dance, Lexington, Ky., May 12, 1874, 0:49 1-2.
Blue Lodge, by Fellowcraft, Lexington, Ky., May 10, 1879, 0:49 1-2.
Duke of Magenta, by Lexington, Saratoga, July 24, 1877, 0:49 1-2.
Idalia, by imp. Glenelg, Long Branch, July 4, 1876, 0:49 3-4.
Sensation, by imp. Leamington, Saratoga, July 22, 1879, 0:49:3-4.
Kimball, by imp. Buckden, Louisville, Ky., May 21, 1879, 0:49 3-4.
Observanda, by Tom Bowling, Louisville, Ky., May 21, 1879, 0:49 3-4.
Grenada, by King Alfonso, Long Branch, July 5, 1879, 0:49 3-4.

FIVE-EIGHTHS OF A MILE.

Bonnie Wood, by imp. Bonnie Scotland, Saratoga, July 20, 1878, 1:02 3-4.
Grenada, by King Alfonso, Saratoga, Aug. 10, 1879, 1:03 1-2.
Harold, by imp. Leamington, Long Branch, July 4, 1878, 1:03 1-2.
Rachel, by imp. Bonnie Scotland, Long Branch, July 6, 1878, 1:03 1-2.
Palmetto, by Narragansett, Saratoga, Aug. 10, 1876, 1:03 1-2.
Rhadamanthus, by imp. Leamington, Saratoga, July 25, 1876, 1:03 1-2.
Egypt (aged), by Planet, Saratoga, July 19, 1879, 1:04.

Aristides, by imp. Leamington, Jerome Park, Oct. 7, 1874, 1:04 1-2.
Volturno, by imp. Billet, Saratoga, Aug. 21, 1878, 1:04 3-4.

THREE-QUARTERS OF A MILE.

First Chance, by Baywood, Philadelphia, Pa., Oct. 17, 1876, 1:15.
Lady Middleton, by imp. Hurrah, Saratoga, Aug. 1, 1879, 1:17, 1:15 1-4. First was dead heat with Checkmate.
Bill Bruce, by Enquirer, Lexington, Ky., May 12, 1876, 1:15 1-2.
Connor, by Norfolk, Carson, Nev., Oct. 19, 1879, 1:15 1-2.
Rhadamanthus, by imp. Leamington, Saratoga, Aug. 19, 1877, 1:15 1-2.
Florence B., by Tom Bowling, Louisville, Ky., Sept. 20, 1879, 1:15 3-4.
Madge, by imp. Australian, Saratoga, Aug. 21, 1874, 1:15 3-4.
Alarm, by imp. Eclipse, Saratoga, July 15, 1872, 1:16.
Belle of the Meade, by imp. Bonnie Scotland, Nashville, Tenn., Oct. 9, 1876, 1:16.
Enquiress, by Enquirer, Detroit, July 5, 1879. 1:16.
Egypt (aged), by Planet, Louisville, Ky., May 26, 1877. 1:17.
Milan, by Melbourne, Jr., Louisville, Ky., May 26, 1877, 1:16.
Girofle, by imp. Leamington, Prospect Park, Sept. 13, 1879, 1:16 1-4.
Spendthrift, by Australian, Nashville, Oct. 8, 1878, 1.16 1-2.
Checkmate, by imp. Glen Athol, Saratoga, Aug. 15, 1879, 1:16 1-4.
Kimball, by imp. Buckden, St. Louis, June 13, 1879, 1:16 1-2.
Mistake, by Waverly, Louisville, Ky., Sept. 23, 1879, 1:16 1-2.
Madge, by imp. Australian, Saratoga, N. Y., Aug. 15, 1876, 1:16 1-2.
Glendalia, by imp. Glenelg, Louisville, Ky., Sept. 24, 1879, 1:16 1-2.
Pigne, by imp. Leamington, Saratoga, Aug. 27, 1877, 1:16 3-4.
Tom Bowling, by Lexington, Long Branch, 1872, 1:16 3-4.
Bowling Green, by Tom Bowling, Louisville, Sept. 24, 1879, 1:16 3-4.
Duke of Magenta, by Denington, Saratoga, Aug. 16, 1877, 1:16 3-4.
Spartan, by Lexington, Saratoga, Aug. 16, 1877, 1:16 3-4.
Sly Dance, by War Dance, Louisville, Sept. 22, 1879, 1:16 3-4.
Bye and Bye, by imp. Bonnie Scotland, Louisville, Sept. 22, 1879, 1:16 3-4.
McWhirter, by Enquirer, Louisville, Ky., May 15, 1879, 1:17.
Wallenstein, by Waverly, Lexington, Ky., May 15, 1879, 1:17.
Countess, by Kentucky, Saratoga, 1873, 1:17 1-2.
Beatrice, by Kentucky, Long Branch, 1:17 1-2.
Luke Blackburn, by imp. Bonnie Scotland, Prospect Park, Sept. 6, 1879, 1:17 1-2.
Oden, by Vauxhall, Saratoga, Aug. 7, 1879, 1:17 3-4.
Idalia, by imp. Glenelg, Saratoga, Aug. 5, 1878, 1:18.

Spartan, by Lexington, Saratoga, Aug. 22, 1877, 1:19.

ONE MILE.

Ten Broeck, by imp. Phaeton, Louisville, Ky., May 24, 1877, 1:39 3-4.

Leander (Searcher), by Enquirer, Lexington, Ky., May 13, 1875, 1:41 3-4.

Redman, by War Dance, Lexington, Ky., May 13, 1876, 1:42 1-4.

Danger, by Alarm, Baltimore, May 23, 1878, 1:42 1-2.

Mahlstick, by Lever, Lexington, Ky., Sept. 20, 1877, 1:42 1-2. Chas. Gorham, by Blarneystone, Lexington, Ky., Sep. 20, 1877, 1:42 1-2. Dead heat.

Grey Planet, by Planet, Saratoga, Aug. 13, 1874, 1:42 1-2.

Dan K., by imp. Bonnie Scotland, Louisville, Ky., May 29, 1877, 1:42 1-2.

Goodnight, by Enquirer, Louisville, Ky., Sep. 23, 1879, 1:42 1-2

Katie Pease, by Planet, Buffalo, N Y., Sep. 8, 1874, 1:42 3-4.

Alarm, by imp. Eclipse, Saratoga, July 17, 1872, 1:42 3-4.

Glenmore, by imp. Glen Athol, Detroit, July 4, 1879, 1:42 3-4.

Virginus, by Virgil, Saratoga, Aug. 4, 1877, 1:42 3-4.

Cammie T., by imp. Glenelg, Louisville, Sept. 20, 1879, 1:43.

Mistake, by Waverly, Louisville, Sept. 26, 1879, 1:43 1-2.

Edinburg, by Longfellow, Lexington, May 11, 1878, 1:43 1-2.

Belle of the Meade, by imp. Bonnie Scotland, Louisville, Sept. 25, 1876, 1:44 1-2.

Belle of the Meade, by imp. Bonnie Scotland, Louisville, Sept. 27, 1876, 1:44 1-4.

Spendthrift, by imp. Australian, Nashville, Oct. 12, 1878, 1:44 1-4.

Clara D., by imp. Glenelg, Sacramento, Sept. 27, 1877, 1:44 1-2.

Astral, by Asteroid, Lexington, Ky., Sept. 12, 1873, 1:44 3-4.

Parole, by imp. Leamington, Saratoga, Aug. 10, 1875, 1:44 3-4.

Aristides, by imp. Leamington, Baltimore, Oct. 22, 1874, 1:44 3-4.

Susquehanna, by imp. Leamington, Saratoga, Aug. 8, 1876, 1:45.

Charley Howard, by Lexington, Saratoga, Aug. 17, 1876, 1:45.

Firework, by Lexington, Baltimore, Oct., 1874, 1:45.

Hamburg, by Lexington, Cincinnati, 1869, 1:45.

Battle Axe, by Monday, Saratoga, 1873, 1:45 1-2.

Spendthrift, (aged) by imp. Bonnie Scotland, Jerome Park, June 6, 1876, 1:46 1-2.

Tom Bowling, by Lexington, Long Branch, Aug. 8, 1872, 1:47.

MILE HEATS.

Kadi, by Lexington, Hartford, Conn, Sept. 2, 1875, fastest second

heat, and fastest two heats ever run, 1:42 1-2, 1:41 1-4.

L'Argentine, by War Dance, Louisville, Ky., Sept. 27, 1879. Beatitude won first heat, 1:42 1-4, 1:42 1-2, 1:45 1-2.

Mark D., by Monday, Sacramento, Sept. 19, 1878, 1:43, 1:42 3-4.

Himyar, by Alarm, St. Louis, June 4, 1878, 1:42 1-2, 1:43 1-2.

Camargo, by Jack Malone, Louisville, Ky., May 20, 1875, 1:42 3-4, 1:43 1-4.

Una, by War Dance, Prospect Park, June 25, 1879, 1:42 1-4, 1:45.

Tom Bowling, by Lexington, ran mile heats at Lexington, Ky., May, 1873, in 1:43 1-2, 1:43 1-2.

Thornhill, by Woodburn, ran first two heats in 1:43, 1:43; Thad Stevens (aged), by Langford, won the third, fourth and fifth in 1:43 1-2, 1:46 1-2, 1:45.

Clara D., by imp. Glenelg, San Francisco, Sept. 13, 1878, 1:43, 1:43 1-2.

Brademante, by War Dance, Saratoga, Aug. 9, 1877, 1:43 1-2, 1:43 1-2.

Bramble, by imp. Bonnie Scotland, Nashville, Oct. 7, 1878, 1:43, 1:44.

Lena Dunbar, by Leinster, Sacramento, Sept. 17, 1878, 1:44 1-4, 1:42 3-4.

Springbok, by imp. Australian, Utica, N. Y., June 25, 1874, 1:45, 1:42 3-4.

ONE MILE AND ONE-EIGHTH.

Bob Woolley, by imp. Leamington, Lexington, Ky., Sept. 6, 1875, 1:54.

Janet Murray, by Panic, Brighton Beach, July 13, 1879, 1:54 3-4.

Blue Eyes, by Enquirer, Louisville, Ky., May 28, 1879, 1:55 1-4.

Warfield, by War Dance, Louisville, Ky., Oct. 1, 1878, 1:56.

Jack Hardy, by imp. Phaeton, St. Louis, June 4, 1878, 1:56.

Fadladeen, (aged) by War Dance, Saratoga, Aug. 19, 1874, 1:56.

Picolo, Concord, Saratoga, Aug. 15, 1874, 1:56.

Himyar, by Alarm, Louisville, Sept. 20, 1879, 1:56.

Jils Johnson, by Longfellow, Lexington, Sept. 11, 1879, 1:56 1-2.

Fannie Ludlow, by imp. Eclipse, Saratoga, Aug. 10, 1879, 1:56 1-2.

Round Dance, by War Dance, Louisville, Sept. 27, 1879, 1:56 1-2.

Konrad, by Rebel Morgan, New Orleans, April 26, 1878, 1:56 1-2.

Ben Hill, by imp. Bonnie Scotland, Louisville, Sept. 25, 1879, dead heat, 1:56 3-4.

Mollie McGinley, by imp. Glen Athol, Brighton Beach, Sept. 10, 1879, 1:57.

Una, by War Dance, Prospect Park, Sept. 11, 1879, 1:57.

Susquehanna, by imp. Leamington, Saratoga, July 24, 1877, 1:57 1-4.

Experience Oaks, by Lexington, Saratoga, Aug. 20, 1872, 1:57 1-4.

Bramble, by imp. Bonnie Scotland, Saratoga, Aug. 17, 1878, 1:58.
Bramble, " " " " " " 9, 1879, 1:58.
Kennesaw, by imp. Glengarry, Louisville, May 28, 1878, 1:58 1-2.
Essillah, by Lever, Nashville, Apr. 29, 1879, 1:58 1-2.
Gabriel, by Alarm, Brighton Beach, Sept. 27 1879, 1:59.
Edinburg, by Longfellow, Louisville, Sept. 25, 1878, 1:59.
Diamond, by imp. Leamington, Ogdensburg, N. Y., Sept. 10, 1878, 1:59.
Lancewood, by imp. Leamington, Saratoga, Aug. 13, 1879, 1:59.
Belle, by Dickens, Saratoga, July 23, 1878, 1:59.
Rhadamanthus, by imp. Leamington, Saratoga, Aug. 15, 1876, 1:59 3-4.
Spendthrift (aged), by imp. Bonnie Scotland, Jerome Park, June 10, 1876, 2:00
Phyllis, by imp. Phæton, Louisville, Sept. 27, 1876, 2:01.
Spendthrift, (aged), by imp. Bonnie Scotland, Jerome Park, June 12, 1875, 2:03 1-4

ONE MILE AND A QUARTER.

Charley Gorham, by Blarneystone, Lexington, May 18, 1877, 2:8 1-2.
Falsetto, by Enquirer, Lexington, May 10, 1879, 2:08 3-4.
Grimstead, by Gilroy, Saratoga, July 24, 1875, 2:08 3-4.
Frogtown, by imp. Bonnie Scotland. Lexington, Ky., May 1872, 2:09 1-2.
Monitor, by imp. Glenelg, Prospect Park, Sept. 9, 1879, 2:10.
Parole, by imp. Leamington, Saratoga, July 20, 1878, 2:10 1-2.
Mate, by imp. Australian, Jerome Park, Oct. 3, 1874, 2:11 3-4.
Preakness, by Lexington Jerome Park, June 13, 1874, 2:12.

ONE MILE AND THREE-EIGHTHS.

Spendthrift, by imp. Australian, Jerome Park, June 10, 1879, 2:25 3-4.
Gov. Hampton, by Planet, Prospect Park, June 21, 1879, 2:26 1-2.
Bramble, by imp. Bonnie Scotland, Long Branch, July 10, 1879, 2:27.

ONE AND A HALF MILES.

Tom Bowling,* by Lexington, May 12, 1874, 2:34 3-4.
Parole, by imp. Leamington, Saratoga, Aug. 14, 1877, 2:36 3-4.
Lord Murphy, by Pat Maloy, Louisville, May 20, 1879, 2:37.
Day Star, by Star Davis, Louisville, May 21, 1878, 2:37 1-2.
Aristides, by imp. Leamington Louisville, Ky., May 7, 1875, 2:37 3-4.
Glenelg, by Citadel Long Branch, Aug. 2, 1870, 2:37 3-4.
Shylock, by Lexington, Jerome Park, Oct. 31, 1874, 2:38.
Baden Baden, by imp. Australian, Louisville, May 22, 1877, 2:38.

Vagrant, by Virgil, Louisville, May 14, 1877, 2:38 1-4.

Peru, by imp. Glengarry, Lexington, Ky., Sept. 11, 1879, 2:38 3-4.

Belle of Nelson, by Hunter's Lexington, Louisville, May 23, 1878, 2:39.

Imp. Saxon, by Beadsman, Belmont stakes, Jerome Park, June 13, 1874, 2:39 1-2.

Tom Ochiltree, by Lexington, Jerome Park, Oct. 14, 1877, 2:43.

Zoo Zoo, by imp. Australian, Saratoga, Aug. 21, 1877, 2:43 1-4.

Duke of Magenta, by Lexington, Jerome Park, June 8, 1878, 2:43 1-2.

*Tom Bowling was permitted to extend the run to two miles. He ran the first mile in 1:41 3-4; mile and a half in 2:34 3-4; one and three-quarters miles in 3:00 3-4; and two miles in 3:27 3-4. The last two unofficial.

ONE MILE AND FIVE-EIGHTHS.

Ten Broek, by imp, Phaeton, Lexington, Ky., Sept. 9, 1875, 2:49 1.4.

Monitor, by imp. Glenelg, Prospect Park, Sept. 13, 1879, 2:50 1-2.

Springbok, by imp. Australian, Jerome Park, June 20, 1874, 2:53.

Brademante, by War Dance. Lexington, May 17, 1877, 2:53 3-4.

Harry Bassett, by Lexington, Belmonte stakes, Jerome Park, June 10, 1871. 2:56.

Mintzer. by imp. Glenelg, Saratoga. July 23, 1879, 2:58.

Katie Pease, by Plant, Ladies' stake, Jerome Park, June 11, 1873, 2:58 1-4.

ONE AND THREE-QUARTER MILES.

One Dime, by Wanderer, Lexington. Sept. 12, 1879, 3:05 1-4.

Irish King, by Longfellow, Sept. 25, 1879, 3;05 1-4.

Courier, by Star Davis, Louisville, May 23, 1877, 3:05 1-4.

Reform, by imp. Leamington, Saratoga, Aug. 20, 1874, 3:05 3-4.

Mate, by imp. Australian, Long Branch, July 15, 1875, 3:06 1-4.

D'Artagnan, by Lightning, Saratoga, July 24, 1875, 3:06 1-2.

Gen. Phillips, by imp. Glenelg, Saratoga, Aug. 5, 1879, 3:06 1-2.

Emma C., by Planet. Louisville, Ky., Sept. 23. 1875, 3:06 3-4.

Frogtown, by imp. Bonnie Scotland, Lexington, Ky., May 26, 1872, 3:07.

Danicheff, by Glenelg. Saratoga, Aug. 9, 1879, 3:07.

Gov. Hampton, by Planet. Prospect Park, Sept. 9, 1879, 3:07 1-2.

Kenny, by Curles, Prospect Park, June 25, 1879, 3:07 1-2.

Leveler. by Lever, Lexington, Sept. 9, 1878, 3:07 1-2.

Neecy Hale, by Lexington. Lexington. Ky., Sept. 14, 1876, 3:07 3-4.

Catesby, by imp. Eclipse. Saratoga, Aug. 15, 1874. 3:07 3-4.

Parole, by imp. Leamington, Saratoga, Aug. 11. 1877, 3:08.

Kennesaw, by imp. Glengarry, St. Louis, June 5, 1878, 3:08.

Duke of Magenta, by Lexington, Saratoga, July 20, 1878, 3:08.

Joe Daniels, by imp. Australian, Travers' Stake, Saratoga, July 13, 1872, 3:08 1-4.

Preakness, by Lexington, Baltimore, Oct. 21, 1864, 3:08 1-2.

Viceroy, by Gilroy, Saratoga, Aug. 9, 1877, 3:08 1-2.

Volturno, by imp. Billet, Brighton Beach, Sept. 16, 1879, 3:08 1-2.

Atilla, by imp. Australian, Travers's Stake, Saratoga, July 25, 1874, 3:09 1-2, 3:08 3-4. The first was a dead heat with Acrobat.

Mintzer, by imp. Glenelg, Saratoga, July 28, 1879, 3:09 1-4.

Falsetto, by Enquirer, Saratoga, July 19, 1879, 3:09 1-4.

Zoo Zoo, by imp. Australian, Saratoga, Aug. 2, 1877, 3.10.

TWO MILES.

Ten Broeck, by imp. Phæton, against time, Louisville, May 29, 1877, 3:27 1-2.

McWhirter, by Enquirer, Louisville, May 28, 1877, 3:30 1-2.

Courier, by Star Davis, Louisville, May 28, 1877, 3:31 3-4.

Katie Pease,* by Planet, Buffalo, Sept. 9, 1874, 3:32 1-2.

True Blue, by Lexington, Saratoga, July 30, 1873, 3:32 1-2.

Jack Frost, by Jack Malone, Cleveland, O., July 31, 1874, 3:33 1-2.

Glenmore, by imp. Glen Athol, Detroit, July 5, 1879, 3:33 1-2.

Lizzie Lucas, by imp. Australian, Saratoga, Aug. 21, 1874, 3:33 3-4.

Creedmoor by Asteroid, Louisville, Ky., Sept. 20, 1876, 3:34.

Geo. Graham, by Rogers; first heat; Louisville, Ky., Sept. 25, 1875, 3:34.

Lord Murphy, by Pat Malloy, Louisville, Sept. 22, 1879, 3:34.

King Alfonso, by imp. Phæton, Louisville, Ky., Sept. 20, 1875, 3:34 1-2.

Hegira, by imp. Ambassador, New Orleans, La., Nov. 23, 1850, 3:34 1-2.

Littleton, by imp. Leamington, Lexington, Ky., May 23, 1871, 3:34 1-2.

Monitor, by imp. Glenelg, Baltimore, Oct. 21, 1879, 3:34 3-4.

Wilful, by imp. Australian, Prospect Park, June 24, 1879, 3:34 3-4.

Charlie Howard, by Lexington, Saratoga, Aug. 10, 1876, 3:35.

Vandalite, by Vandal, Breckinridge Stake, Baltimore, Oct. 23, 1874, 3:35.

Himyar, by Alarm, Louisville, Sept. 25, 1879, 3:35.

Falsetto, by Enquirer, Saratoga, Aug. 14, 1879, 3:35 1-4.

Volturno, by imp. Billet, Baltimore, Oct. 25, 1879, 3:35 1-4.

Vandalite, by Vandal, Dixie Stake, Baltimore, Oct. 20, 1874, 3:35 1-2.

Harry Basset, by Lexington, Saratoga, Aug. 16, 1871, 3:35 1-4.

Vigil, by Virgil, Baltimore, Oct. 28, 1876, 3:37 1-4.

*Katie Pease came in first, but was disqualified, and race given to Lizzie Lucas.

TWO MILE HEATS.

*Brademante, by War Dance, Jackson, Miss., Nov. 17, 1877 (?) 3:32 1-4, 3:29.?

Willie D., by Revolver, Prospect Park, Sept. 11, 1879, 3:34 1-2, 3:35.

Lottery, by Monday, Sacramento, Cal, Sept. 21, 1878, 3:36, 3:35 1-2.

Arizona, by Lexington, Louisville, Ky., May 18, 1875, 3:37 1-4, 3:35 1-2.

Aureola, by War Dance, Lexington, Sept. 18, 1872, 3:37 3-4, 3:35 1-2.

London, by Lightning, Nashville, Oct. 5, 1872, 3:36 3-4, 3:37 1-4.

Bushwhacker, by imp. Bonnie Scotland, Baltimore, Oct. 22, 1878, 3:36, 3:36 1-2, 3:38 1-2.

Princeton won second heat by head. Bushwhacker second; best average three heats.

Belle of Nelson, by Hunter's Lexington, Cincinnati, June 1, 1878, 3:37 1-4, 3:36 1-4.

Mollie Jones, by Roxbury, Galesburg, Ill., July 4, 1874; Rocket won first heat, 3:36, 3:40, 3:37 1-4.

Eolus, by imp. Leamington, Baltimore, May 28, 1874; the fastest third heat, 3:40, 3:39 1-4, 3:36 3-4.

Lancaster, by Lexington, Lexington, Ky., Sept. 12, 1867, 3:35 1-4, 3:38 1-4.

Jack Sheppard, by Jack Malone, Nashville, Oct. 12, 1876, 3:35 3-4, 3:42 1-2.

Irish King, by Longfellow, Baltimore, Oct. 21, 1879, 3:37 3-4, 3:37 3-4.

Harkaway, by Enquirer, St. Louis, June 7, 1878, 3:39, 3:35 1-4.

*Brademante's time very doubtful.

TWO MILES AND ONE-EIGHTH.

Aristides, by imp. Leamington, Lexington, Ky., May 10, 1876, 3:45 1-2.

Mate, by imp. Australian, Saratoga, July 31, 1875, 3:46 3-4.

Monmouth, by War Dance, Louisville, May 19, 1875, 3:48 1-4.

Big Fellow, by War Dance, May 15, 1874, 3:50.

Dave Moore, by Longfellow, Lexington, May 16, 1879, 3:50 1-2.

Ferida, by imp. Glenelg, Prospect Park, Sept. 5, 1879, 3:54.

Springbok, by imp. Australian, Saratoga, Aug. 3, 1874, 3:56.

Sultana, by Lexington, Jerome Park, Oct. 7, 1876, 3:56 3-4.

TWO MILES AND A QUARTER.

Preakness, by Lexington; Springbok, by imp. Australian, dead heat, 3:56 1-4.

Harry Bassett, by Lexington, Saratoga, July 16, 1872, 3:59.

Wanderer, by Lexington, Saratoga, Aug. 13, 1874, 4:00 1-2.

Kentucky, by Lexington, Saratoga, Aug., 1865, 4:01 1-2.

Fortuna, by Enquirer, Louisville, May 23, 1879, 4:01 1-2.

Bramble, by imp. Bonnie Scotland, Baltimore, May 24, 1879, 4.02.
Mollie McCarty, by Monday or Eclipse, Chicago, June 25, 1879, 4:02.
Muggins, by Jack Malone, Saratoga, Aug., 1867, 4:03.

TWO AND A HALF MILES.

Aristides, by imp. Leamington, Lexington, Ky., May 13, 1876, 4:27 1-2.
Katie Pease, by Planet, Buffalo, Sept. 10, 1874, 4:28 1-2.
Ballankeel, by Asteroid, Baltimore, Oct. 22, 1874, 4:31 3-4.
Helmbold, by imp. Australian, Long Branch, July 30, 4:32 1-2.
Tom Ochiltree, by Lexington, Jerome Park, June 18, 1877, 4:36 1-2.
Edinburgh, by Longfellow, Cincinnati, June 7, 1879, 4:36 1-2.

TWO MILES AND FIVE-EIGHTHS.

Ten Broeck, by imp. Phaeton, Lexington, Ky., 1876, 4:58 1-2.

TWO MILES AND THREE-QUARTERS.

Hubbard, by Planet, Saratoga, 1873, 4:58 3-4.
Kentucky, by Lexington, Jerome Park, Oct. 3, 1866, 5:04.
Tom Ochiltree, by Lexington, Jerome Park, June 17, 1876, 5:09 1-4.

THREE MILES.

Ten Broeck, by imp. Phæton, Louisville, Ky., Sept. 23, 1876, 5:26 1-2.
Monarchist, by Lexington, at Jerome Park, 1872; first mile, 1:45; 5:34 1-2.
Tom Ochiltree, by Lexington, Long Branch, July 6, 1876, 5:35 3-4.

THREE MILE HEATS.

Brown Dick, by imp. Margrave, New Orleans, April 10, 1865; the best second heat on record, and second best three mile heat race, 5:30 3-4; 5:28.

Mollie Jackson, by Vandal, Louisville, Ky., May 25, 1861; Sherrod won the second heat. The last two miles of the first heat were run in 3:35; the last two of the second heat in 3:36 3-4: the ninth mile in 1:48 1-4. This is the best three heats and the best third heat on record, 5:35 1-2; 5:34 3-4; 5:28 3-4.

Norfolk, by Lexington, Sacramento, Cal., Sept. 23, 1875; best average two heats, 5:27 1-2; 5:29 1-2.

Vandal, by imp. Glencoe, Lexington, May 26, 1855, 5:36 1-2; 5:33.
Whisper by Planet, St. Louis, June, 8, 1878, 5:39; 5:35 1-2.

FOUR MILES.

Ten Broeck, by imp. Phæton, vs. Fellowcraft's time, Louisville, Ky., Sept. 7, 1876, 7:14 3-4.

Fellowcraft, by imp. Australian, Saratoga, Aug. 20, 1874, 7:19 1-2.

Lexington, by Boston, vs. time, New Orleans, La., April 2, 1855, 7:17 3-4.

Lexington, by Boston, beating Lecomte, New Orleans, April 14, 1855, 7:23 3-4.

Janet, by Lightning, Louisville, Sept. 27, 1879, 7:29.

Wildidle, by imp. Australian, San Francisco, Oct. 28, 1875, 7:25 1-2.

Idlewild, by Lexington, over Centreville Course, L. I., June 25, 1863, 7:26 1-4.

Thad. Stevens, by Langford, best second heat, California, Oct. 18, 1873, 7:30.

Kentucky, by Lexington, Saratoga, 1866, 7:31 1-2.

Silent Friend, by imp. Australian, New Orleans, April 21, 1873, 7:30 1-2.

Kentucky, by Lexington, vs. time at Jerome Park, 1867; first two miles, 3:36; first three 5:29; 7:31 3-4.

Abd-el-Kader, by Australian, Saratoga, 1869, 7:31 3-4.

Abd-el-Koree, by imp. Australian, Jerome Park, Fall 1871; best time for a three-year-old, 7:33.

Monarchist, by Lexington, Jerome Park, 1872; first two miles, 3:39 3-4; first three, 5:36; 7:33 1-2.

Tom Ochiltree, by Lexington, Jerome Park, Oct. 12, 1876, 7:36.

FOUR MILE HEATS.

Lecompte, by Boston, at New Orleans, April 8, 1854, beating Lexington and Reube, 7:26, 7:38 1-4.

Rupee, by Voucher, April 10, 1858, 7:39, 7:35.

Miss Foot, by imp. Consol, at New Orleans, March 26, 1842, 8:02, 7:35.

Fashion, by imp. Trustee, over Union Course, L. I., May 10, 1842, beating Boston match, 7:32 1-2, 7:45.

Morgan Scout, by John Morgan, at Lexington, Ky., 1870, best race ever run in Kentucky, 7:32 1-2, 7:43 1-2.

George Martin, by Garrison Zinganzee, beating Hannah Harris and Reel, March 29, 1843. Reel broke down in first heat, 7:33, 7:43.

Bushwhacker, by imp. Bonnie Scotland, Baltimore, Oct. 26, 1878. Princeton won second heat, 7:31, 7:36 1-4, 8:29.

Glenmore, by imp. Glen Athol, Baltimore, two and three heats, best third heat, 7:29 1-2, 7:30 1-4 7:31.

Tally-ho, by Boston, at Union Course, L. I., Oct. 8, 1849; Free Trade won the first heat, Boston the third, and Tally-ho second and fourth, 7:33 1-2, 7:43 1-2, 7:52, 8:10 1-2.

HURDLE RACES.

Joe Rodes, by Virgil, mile heats, over four hurdles, St. Louis, June 4, 1878, 1:50 3-4 1:50 1-4.

Judith, by imp. Glenelg, mile heats, over four hurdles, Prospect Park, Sept. 11, 1879, 1:52, 1:52.

Lobelia, by imp. Bonnie Scotland, mile heats, over four hurdles, Fashion Course, L. I., Sept. 11, 1869, 1:51 3-4, 1:53 1-4.

Waller, by imp. Hurrah, one and a quarter miles, over five hurdles, Saratoga, Aug. 14, 1878, 2:21 1-2.

Disturbance, by Chillicothe, one and a quarter miles, over 5 hurdles, Saratoga Aug. 22, 1878, 2:21 3-4.

Problem, by Pimlico, one and a half miles over 6 hurdles, Long Branch, July 5, 1879, 2:50.

Derby, by Eugene, one and a half miles, over six hurdles, Long Branch, July 2, 1878, 2:52.

Judith, by imp. Glenelg, one and three-quarter miles, over seven hurdles, Long Branch, Aug. 28, 1879, 3:36 1-2.

Tom Leathers, by Camps Whale, two miles, over eight hurdles, New Orleans, April 16, 1875, 3:47 1-2.

Redman, by War Dance, two miles, over eight hurdles, Louisville, Ky., May 19, 1876, 3:48 1-2.

Captain Hutchinson, by Voucher, two miles, over eight hurdles, Columbus, O., July 3, 1875, 3:50.

Jonesboro, by Lexington, two miles, over eight hurdles, welter weights; New Orleans, April 11, 1868, 3:51 1-2.

Milesian, by imp. Mickey Free, two miles, over eight hurdles, welter weights; Long Branch, Aug. 3, 1872, 3:52 1-2.

Cariboo, by Lexington, two and a quarter miles, over nine hurdles, Long Branch, 1875, 4:33.

STEEPLE CHASES.

Dead Head, by Julius, about two and three-quarter miles, thirty-six leaps, Saratoga, Aug. 26, 1878, 5:33 1-2

Trouble, by Ulverston, about two and three-quarter miles, thirty-six leaps, Saratoga, Aug. 19, 1876, 5:34 3-4.

Duffey, by Hunter's Lexington, about two and three-quarter miles, thirty-six leaps, Saratoga, Aug. 5, 1873, 5:48 3-4.

TRAINING TO TROTTING.

The idea of the average horse owner is that training means pampering the horse. Nothing could be further from the mark. It truly means the very best and most intelligent care, feeding and exercise for the work to to be performed, and this exercise must be in proportion to the distance.

The artificial care given the horse in confinement renders blankets necessary for all fast working horses. Doubly so for turf horses, whose pace is of the most exhausting kind. To get rid of superfluous flesh sweating and exercise is necessary. The superfluous flesh and undue moisture of the body having been properly reduced, then the pace of the horse should correspond to that expected in the final trial. That is for mile heats a faster pace will be required than for longer heats, but the horse must be carefully worked up to the point, the improvement being carefully and intelligently watched, that as the day of trial approaches he may have a real trial of speed for the distance to be trotted. There is, however, no rule that can be laid down as to the amount of work to be done before this trial takes place. It will depend upon his condition while at work and the manner in which he accomplishes his brushes, as spurts of speed are called for short distances. These are among the most important parts of training, since they tend not only to extend the stride of the horse and improvement in speed, but the manner of coming out of them will indicate the condition of the animal.

High-strung, eager, generous horses must be handled in a very different manner from sterner tempered ones. In any case, the horse must come to place implicit confidence in his driver. The first must be restrained; the second urged. The first named seldom have the power to accomplish all they would. The second must be made to know that it is speed and distance that is required, and that they must go the pace if it is in them.

Feeding is essentially important. Some horses crave much hay. Such must be restrained: some gluttons will eat their bedding. If so, they must be muzzled when not feeding, and always so at night. If a horse is so light a feeder that he will not eat twelve quarts of oats a day, he may have a little Indian corn, but this only in exceptional cases. Sound, heavy oats, thoroughly cleaned and sifted, should constitute the feed of the trotting horse, or any horse of fast work. The light feeder must be carefully watched in his work. Some horses will eat fourteen to sixteen quarts of oats a day. Such should have corresponding exercise: for in no event must fat be allowed to accumulate. We should prefer to limit any horse, however large and powerful, to fourteen quarts of oats per

day, or rather to that number of pounds. As a rule twelve quarts or pounds should suffice for the average horse.

Hiram Woodruff, than whom there is no better authority, in his work on "The Trotting Horse of America," in relation to the preparation which precedes the first trial, says:

During the preparation which precedes the first trial, it will be necessary to give the horse one or two sweats. Whether it ought to be one or two must be indicated by the condition and nature of the animal, the races in which he is engaged, and resolved by the judgment of the trainer. The amount of clothes in which he shall be sweated must be determined by the same considerations. Some may require a blanket and hood, and a wrapper round the neck to start the perspiration out of them; while there are others that will sweat freely with but little clothes, and scrape well when more have been thrown on at the end of the jog. One thing may certainly be said, that a sweat obtained without the use of heavy clothing is more satisfactory and better than one with it, provided the latter method does not include a good deal more work to get the sweat. Only a moderate quantity of clothing and little work while the horse is going are the best for a sweat, if a good scrape can thus be obtained. When the horse comes from the drive, and is taken out of the wagon, he will soon be ready to scrape. That done, he must be blanketed up again, and walked about out of the draft. A favorable day for the sweat ought to be taken advantage of, as a matter of course. Another light scrape may probably be had after some little time spent in walking in the blankets; but, if the perspiration does not continue so as to give this second scrape, it is not to be forced by more work in the clothes. To be of use in itself, and as a satisfactory indication that the condition of the horse is advanced it must come of itself. During the time this scraping process is in course of operation, the trainer having the conduct of it should not be in a hurry. The same things that are said to cure a man's cold—patience and a little water-gruel—will often do wonders in procuring a good sweat. Commonly, however, it is easy enough to get the sweat and scrape, but more difficult to cool the horse out properly. In order to do this well, he is to be clothed again, and led very gently about for a considerable period, so that he may become cool gradually, and the perspiration may dry away by degrees. This walking is to be out of all draft as much as possible; and it will not do to hurry it over, and go to the stable, until the horse has cooled off well and gradually. When the proper state has been reached, the horse is to be taken into the stable and his body is to be well dressed. This done, he is to be re-clothed, and again led into the air.

A few sups of gruel, made of Indian meal or fine shorts, from half a

pint to a pint of the meal stirred into a bucket of water may now be given to the horse, or water with the chill taken off it may be used as a substitute for the gruel. When taken into the stable again, which will be after a little more walking about in the air, the legs are to be put in tubs of warm water, the body clothing being kept on. The legs are then to be well washed with the water and castile soap, and when dried off to be bandaged. These bandages should be of light flannel, and it is immaterial whether it is red or white. They are not to be put on tight. The legs of a horse ought never to be bandaged tight, for such a course impedes the circulation into the feet, where there is a great necessity for it; but losing sight of this, the bandages are sometimes pulled so that it looks as if they were intended to serve as a tourniquet, and stop the circulation of the blood altogether. Neither can it serve any useful purpose, that I can see, to bind the suspensory ligament up to the bone of the leg. Nature intended that in the horse it should stand out from it, as we see in the fine flat legs of the best runners and trotters. Whatever support is required may be obtained with only a moderate degree of tightness; and I have sometimes thought that an elastic stocking, such as our best surgeons use in cases of bad strain to the nerves and muscles of the human foot and ankle, would be a very useful article in a training-stable.

DRIVING.

The average farmer's boy supposes he can drive a trotting horse. Has he not seen the pictures of drivers sitting back, apparently holding to the reins with a grasp, as though the stronger the horse was pulled the faster he could go? Such driving never got speed out of a horse. The best drivers simply allow the horse to pull on the bit with sufficient force to steady himself, and this pulling force must be graduated according to circumstances. It is true many fast horses are hard pullers, and generally so from defects in training. The bit and reins are intended simply as the medium of communication between the horse and the driver, and the more intelligently the horse is trained to their use, the more will be got out of him. The horse should be taught to take a firm hold of the bit, not for the purpose of pulling upon, but that the driver may give the horse needed support and steadiness, and that intelligent action may be established between the driver and the horse.

The object of keeping the horse well in command during fast work, on the road as well as on the track, is that he may instantly respond to the wish of the driver through the medium of the reins. Thus he may be pressed from day to day in his speed, until he at last comes to the full measure of his powers.

Although trotting speed does not come to the horse until some years

after he is fully developed in growth, the history of trotting shows that this increase of speed continues to develop until the horse is from ten to twelve years old. Hence there should be no hurry to develop the animal while young. He should be driven from the time he is three years old, sufficient to cause him to lengthen his stride as much as possible. He should be taught to listen quickly, never to frighten or shy at any object, and this by familiarizing him with whatever may be near. In his brushes, either on the road or the track, however sharp they may be, they should never be extended until the animal shows signs of distress. When he is being regularly trained for some public trial of speed, it will be time enough to find out if he can go the desired pace.

DRIVING ON THE ROAD.

Road driving, like driving or riding a race, is a fine art. In road driving the object is not only to get good speed out of the animal driven, but he must also be made to go in fine style. With a horse of naturally fine action, this, if the driver understands his business, is not difficult. If not a horse of naturally fine style and action, he may be spoiled. For road work the horse should have been better flexed than when he is to be used for trotting a race. He must be able to turn out quickly and handsomely in passing or meeting other teams. When being driven slowly, he must carry himself handsomely. Thus something must be sacrificed to this end.

Every horse should have a perfect fitting bit. It should be of the proper size and length for the mouth, and this can only be decided by trial. Keep trying different bits until you find one in which the horse works comfortably. Above all, in handling a young horse do not injure the mouth with a cruel or rough bit. Above all, never be so cruel as to jerk his mouth with the reins. The bit is the medium of communication between the driver and the horse. If there is any speed in the horse, it is to be gotten out of him by means of the bit, and hence the more sensitive you can keep the mouth, the more likely you are to succeed. If you render the mouth numb or callous through pulling, twitching, sawing or other smart tricks of drivers, you do so to the permanent injury of the horse. Therefore first acquire a nice touch yourself, and there will be no difficulty in imparting it to the horse.

Never lose your temper with the horse. If a horse does so that is no reason why you should. Never strike a horse with the whip for any fault, and then jerk him back with the reins. If necessary to punish him, first assure yourself that you have him sufficiently well in hand so he cannot "jump out of the harness." Have a definite object in view, for every use of rein or whip. Above all avoid a steady, rigid pull on the horse. Some horses will not trot without being pulled hard. It is

usually from defect in training. The perfect horse is trained to pull just sufficient to steady himself in harness. How Hiram Woodruff drove, he tells in his "Trotting-Horse of America." No one, during his life, or since his death, was better authority in such matters. Hence, we cannot do better than to give it to our readers in his exact words.

In order that a fast horse should be under circumstances to do his best, he should be as much at his ease in his harness and general rig as possible. If he is not, he is placed at almost as much disadvantage as if sore or stiff, or suffering from some bodily ailment. You may see horses brought out of the stable to trot with a very tight check to keep their heads up, and a tight martingale to keep them down. Such a horse is in irons; and when to this is added a dead drag at the reins, and no movement of the bit from end to end, I cannot see how he could do his best. People talk about a steady, bracing pull; but, in my opinion, that is not the right way to drive a trotter. There is a great difference between letting go of your horse's head, and keeping up one dull, deadening pull all the time. The race-horse riders practice what is called a bracing pull; and, a great many times, I have seen their horses tire under it without ever running their best. The steady pull checked them. The pull should be sufficient to feel the mouth, and give some support and assistance, so as to give the horse confidence to get up his stride. More than that is mischievous. To keep the mouth alive, the bit must be shifted a little occasionally. A mere half-turn of the waist, or less than half a turn, by which the thumb is elevated and the little finger lowered, is sufficient to shift the bit, keep the mouth sensitive, and rouse the horse.

The reins are to be held steadily with both hands while this play with the wrist is made; and it is, of course, only done with one wrist at a time. The hands should be well down; and the driver ought not to sit all of a heap, with his head forward. Neither should he lean back, with his bodily weight on the reins, which, in that case, are made a sort of stay for him. He should be upright; and what pulling he must do should be done by the muscular force of the arms. The head and the arms are what a good driver uses; but some hold their arms straight out, and pull by means of putting the dead weight of their bodies on the reins. If, instead of lying back, and putting their bodily weight on the reins, with which latter they take a turn round their hands, drivers would depend upon their muscular strength, they could let up on the pull, graduate it, and so ease the horse from time to time instantaneously. The driver who depends upon the arms has command of the horse: he who substitutes bodily weight with the reins strapped round his hands, has not half command of the horse, or of himself either; and, if the horse is a puller, he will soon take command of the driver. The reason of it is, that there

is no intermission of the exertion, no let up, either for man or horse. Besides, in that way of driving, it is impossible to give those movements to the bit which seem to refresh and stimulate the horse so much. When a horse has been taught the significance of this movement of the bit, the shift by the turn of the wrist, he will never fail to answer it, even though he should seem to be at the top of his speed. The moment he feels this little move of the bit in his sensitive mouth, he will collect himself, and make another spurt; and the value of this way of driving is, that the horse is not likely to break when thus called upon, while a high-strung, generous horse, if called upon for a final effort with a whip, is as likely to break the moment it falls on him as not. I have won many a very close heat by practising this movement, and therefore I have no hesitation in recommending it. It is not difficult to acquire, and the horse soon comes to know what it means.

Let us come now to the way of taking hold of the reins. A wrap around the hand, such as running-horse riders take, is clumsy and bad. I do not know whether many people take hold of the reins as I do, or not. Perhaps not. Sim. Hoagland is the only one who takes hold precisely as I do, so far as I have observed. When we have been jogging horses together at early morning, we have often talked over these matters; and, whether our way was the best way or not, we could never see any other that suited us half so well.

I will try to explain how I hold the reins: I could show it in two seconds. Take, first, the right-hand rein. This, coming from the bit, passes between the little finger and the third finger, over the little finger, then under the other three fingers, and up over the thumb. The left-hand rein is held in the left hand exactly in the same way; but the bight of the slack of the rein is also held between the thumb and forefinger of the left hand. This gives some substance in that hand; but, if it is found inconvenient to have it there by those who have small hands, it may be dropped altogether. A firm grasp on each rein, with the backs of the hands up, and without any wrap, is thus obtained. It is a great point in driving to be able to shift the reach—that is, the length of the hold you take—without for an instant letting go of the horse's head. With this way of holding the reins, it is easily done. If I want to shorten the hold on the left hand rein (the near one), I take hold of that rein just behind the left hand with the thumb and forefinger of the right hand, and steady it. This is very easily done; and it does not interfere at all with the command of the off rein with the right hand. The near rein being thus steadied behind the left hand, I slide that hand forward on the rein, which is kept over the little finger, under the other three fingers, and over the thumb all the time, and then shut the grasp again on the new reach.

A shift with the right hand is made just in the same way, by taking hold and steadying the rein behind that hand with the thumb and forefinger of the left hand.

"I have often observed, that, with other methods of holding the reins, there was great difficulty in shifting the reach. The driver tries to do it; but, for an instant, he has let go of the horse's head on one side altogether, and broken his stride. When this is found to be the case, the dead pull all the time is adopted; and this spoils the freedom and elasticity of the horse's stride, and chokes off his wind. I do not intend this to be taken as instruction for professional drivers. Every driver has a way of his own; and some of them have very good ways, for, as I have taken occasion to state before, they drive well. But what I have set down above may be of service to gentlemen who drive their own horses, and to those young men who, having as yet no settled method of their own, may think it well enough to try that which I have found to answer. Another word about bits. I am opposed to the use of severe bits, and complicated things of that sort. Some of the inventors of such things say I am prejudiced; but I don't think I am. If a man has a horse that cannot be driven with a bar-bit or a snaffle, he may as well sell him, except it is a very exceptional case. Where are these kinds of severe complicated bits most in use? Why, in England; five hundred or a thousand of them are used there to one that is used here: and where do the horses trot the best? These bits are mostly invented by men who have had no practical experience whatever as to what sort of driving a fast trotter requires to keep his gait square and bold, and induce him to do his best when it is called for. When a horse has a good mouth—and a bad one is almost always the fault of bad breaking and driving—the easier the bit you use, the better he will act for you, and the more speed he will show you."

Trotting Horses.

It has often been said of Northern and Eastern men, that they do not take kindly to the saddle. In a sense this is true, especially in the North. In England the passion for riding in the saddle grew up at a time when there were, so to speak, no roads. In the earlier settlement of America, throughout the then vast timber region, the same state of things existed: but a people who settle a new country have something else to think of than riding to hounds or other pleasure riding. So the country became settled; the level or gently undulating nature of the country rendered good roads passable at light cost, and the absence of preserves of game, a landed aristocracy, and the improvement in vehicles for pleasure and use, tended to force public taste in the direction of driv-

ing. Hence the early appreciation of the trotting horse, and the wonderful development in speed in this direction.

In the South, racing stock held its own, and does even to this day; and nobly have they contested the palm of victory, and successfully, on many hard fought fields of racing blood in England and our own country. At the North, however, the trotting horse now reigns supreme. It is the intention here to present something of the wonderful increase in speed and endurance of the trotting horse of America, with information of the most celebrated horses that early gave fashion to this style of going, and a full list of animals and performances, that the reader may see at a glance the growth of this passion for trotting horses.

EARLY TROTTERS.

Until 1823 we have but little authentic information that regular trotting courses were established, and not until 1830 were fast trotting courses established. According to *Porter's Spirit of the Times*, the first public trotting in America for a stake was a match against time for $1,000.

In 1824, A. M. Giles trotted his horse 28 miles in one hour and fifty-seven seconds. The same year Topgallant and Betsey Baker were matched to trot three miles in harness for $1,000 a side. The race was won by Topgallant by 40 yards, in 8 minutes, 42 seconds. Topgallant also trotted 12 miles on the road in 39 minutes. The "Albany pony" did a mile in 2 minutes, 40 seconds. The Treadwell mare did one mile in 2:34; and Boston Blue trotted 18 miles within the hour. Boston Blue is reported to have been the first horse that trotted a mile in three minutes; it having been done in 1818. So that it will be seen that the Treadwell mare in 1824 had reduced the time to 2:34. Yet for many years after a 2:40 horse was considered extraordinary, as also was any horse capable of going on the road in 3 minutes.

In 1827, on the Hunting Park Association of Philadelphia, Screwdriver won two heats at two miles, beating Betsey Baker in 8:02 and 8:10, the three best time on record. Dutchman afterwards accomplished the same distance in 7:32 1-2, and Lady Suffolk in 7:40 1-2.

In 1840, on the Long Island course, Jerry beat Whalebone in a three mile trotting race, in 8:23 the first heat, and 8:15 the second. The best time for 2 mile heats that year was 5:22, 5:21; for 3 miles, 8:26, 8:27, 8:41, 8:56. On long distances Sweetbrier accomplished six miles in 18:52.

In 1834 Edwin Forrest, as yet an unentered horse, trotted his mile in 2:31 1-2, beating Sally Miller. The course was 1 mile and 10 yards in length.

In 1835 Dutchman made four miles, under the saddle, in 11:19 and 10:51, and Dolly, by Messenger, out of a thoroughbred mare, five miles

to wagon, carrying two men, weighing 310 pounds, in 16:45; and immediately was started again to do 10 miles more, which she accomplished in 34:07. The same year the horse Daniel D. Thompkins, under the saddle, trotted three mile heats in 7:59 and 8:10.

In 1842 Ripton beat Lady Suffolk, at 3 miles in harness, in 5:07 and 5:17.

In 1843 Lady Suffolk made mile heats in 2:28 1-2, 2:28, 2:28, 2:29 and 2:32, which was not again equaled until 1854, when this record was covered by Tacony.

In 1844 Cayuga Chief made the first half mile in a race in 1:15, the fastest yet made in public; and Fanny Jenks accomplished 100 miles, in harness, in 9 hours 38 minutes 34 seconds. The slowest mile was done in 6:25 and the fastest in 4:47. At the end of the race this mare was driven an extra mile in 4:23.

In 1849 Lady Suffolk trotted 19 times and won 12, beating Grey Eagle and Mac twice, Pelham five times, Lady Sutton twice, Trustee four times; also beat Black Hawk, Gray Trouble, Plumbay and other horses. This year a Canadian mare, Fly, is said to have been driven from Cornwall to Montreal, ninety miles, in 8 hours and 15 minutes. Fanny Jenks made 100 miles in 9 hours 38 minutes and 34 seconds. Fanny Murray trotted one hundred miles in 9 hours 41 minutes 23 seconds.

In 1852 Tacony won 12 races, beating all the best horses of the day, making a single mile in 2:26: two miles in 5:02, and was beaten only twice. As a 3 year Ethan Allen trotted this year in 3:20. Flora Temple this year won her first purse, on the regular turf, in 2:41.

In 1853 the entire sporting interest was centered in Flora Temple and Tacony. Flora this year beat all the best horses of the day, winning seventeen times. Her best time at mile heats was 2:27, 2:28, and at 2 mile heats 5:01 1-2, 4:59. This year Tacony trotted a mile in 2:25 1-2.

In 1856 the contest lay principally between Flora Tempte and Lancet. Flora made 11 races, winning nine, beating Lancet four times in harness, and Tacony three times in harness, Tacony going under the saddle. This year Flora Temple lowered the one mile record to 2:24 1-2.

That the trotting horse of America owes his great powers to the infusion of thorough blood, we have before staated. To Imported Messenger is this due in the greatest degree. Messenger's sire was Mambrino, his second sire Engineer, and his third sire Samson. Thence to Blaze, Flying Childers and the Darley Arabian. Samson is reported to have been coarse and homely, and Engineer rough and coarse, but both of these horses were of extraordinary substance.

Another great trotting sire of America was imported Bellfounder. There has been much controversy over his breeding, first and last, but

that he was a staunch trotter, and a getter of admirable horses, there is no doubt, giving splendid action to his get. Still, it must be admitted that, admirable as was Bellfounder himself, his get was not equal to the descendants of Messenger in all that constitutes speed, endurance and action.

Durac also became a valuable factor in our trotting blood. His strain of blood appears in the Medley's, Durac Messenger's, Mambrino Chief's and Gold Dust's.

One of the sub-families of Messenger's blood, Hambletonian, who united the blood of Messenger and Bellfounder, has raised the trotting horse of America to the highest point of perfection. He was not a handsome horse from a thoroughbred standpoint, if indeed he was thoroughbred, which has been doubted. It has been given as follows:

Hambletonian was by Abdallah; he by Mambrina, a son of Messenger. The dam of Abdallah, the mare Amazonia. The dam of Hambletonian by imported Bellfounder; second dam by Hambletonian; third dam, Silvertail, said to have been by imported Messenger.

In all that constitutes stoutness and ability to perform, in freedom from tendency to disability, his stock has been wonderful. Noted for immense and strong joints, length and strength of bone, magnificent muscular development, prominent, square, massive build, mighty hips and excellent barrel, all knit together to form a most admirable frame, united to a nervous constitution, that reproduced itself in his descendants, in a most wonderful degree.

In relation to the descendants of the progenitors of the strain of trotting blood, Mr. H. T. Helm, of Chicago, a breeder of good horses, and a close students in horse history, in his work, "American Roadsters and Trotting Horses," says of the the trotting horse of to-day: "The combined Abdallah-Bellfounder is a horse of the teens: "Goldsmith Maid, 2:14; Dexter, 2:17 1-4; Gloster, 2:17; Bodine, 2:19 1-4; St. Julien, 2:22 1-2; Gazelle, 2:21; Fullerton, 2:18; Mountain Boy, 2:20 3-4; Jay Gould, 2:21 1-2; Nettie, 2:18; Startle, ——. Joe Elliot would in his opinion, have probably stood as a bright star in the firmament." We can add to this our own opinion as a breeder of descendants of Messenger and Bellfounder many years ago, that we never had a disappointing colt. They were mighty driving horses, of great bone, muscle and sinew, of great lung power, and of course of great endurance. Of some of the truly great descendants of this blood, the authority previously quoted says:

GOLDSMITH MAID,

The Queen of the Trotting Turf, was foaled in 1857, and is now nineteen years old. She was bred by John D. Decker, of Sussex county,

N. J. Her dam was one of those yellow-bay mares so common in the produce of old Abdallah. She was undersized, fretful, and of a nervous temperament, and up to the age of six years had performed no work of any kind, except to run occasional races about and on the farm, for the amusement of the boys. In 1863 she was sold by Mr. Decker for $260; the purchaser selling her again, on the same day, to Mr. Tompkins, for $360; and she was soon afterward bought by Mr. Alden Goldsmith, for $600. The eye of the practical horseman discovered that she was worth the handling. He discovered her ability, and soon brought the world to a knowledge of her value. Under his careful and patient management, and the skillful drivers employed by him, she soon displayed such speed and extraordinary qualities of game and endurance, that he was able to sell her, at about the age of eleven years, for the sum of $20,000. The purchasers were B. Jackman and Mr. Budd Doble, and, under the guidance of the latter, she has steadily advanced in a career of fame that is without a parallel in the history of the trotting turf. She was subsequently sold, by the two gentlemen last named, to H. N. Smith, for the sum of $37,000, and yet remains his property. She has been matched against all the great trotters of her period; and, while she has occasionally lost a race, she has ultimately vanquished all competitors, and steadily lowered the record for trotting performances, and at the age of eighteen, marked the marvelous, and thus far unapproachable, record of a mile in 2:14.

Twice during the year 1876 she trotted in a race in 2:15, and although in her first race against the renowned Smuggler she was beaten, she by no means surrendered her queenly scepter, for again, at Buffalo, she asserted her supremacy in the three fastest successive heats on record. Proudly does she command the sympathy and applause of all beholders when she hurls at her powerful competitor the defiant challenge, "You may become King, but I am yet Queen."

It were useless to mention the names and performances of others; there is no name that can be compared with that of the little bay mare; the fame and the radiance of all others pale before the brilliancy of a renown that followed her to the age of twenty years, and has been witnessed on every great course throughout the expanse of a continent. I subjoin a description of the Trotting Queen, from the pen of one of our most accurate and capable writers:

Goldsmith Maid is a bay mare 15 1-4 hands, no white. She appears, at first glance, to be rather delicately made, but this conception is drawn from the form, rather than the quality of her make-up. Her head and neck are very clean and blood-like; her shoulder sloping and well placed; middle piece tolerably deep at the girth, but so light in the waist as to give her a tucked-up appearance, and one would say a lack of constitu-

tion, but for the abundant evidence to the contrary; loin and coupling good; quarters of the greyhound order—broad and sinewy; her limbs are clean, fine-boned and wiry; feet rather small, but of good quality. She is high mettled, and takes an abundance of work without flinching. In her highest trotting form, drawn to an edge, she is almost deer-like in appearance, and when scoring for a start and alive to the emergencies of the race, with her great flashing eye and dilated nostrils, she is a perfect picture of animation and living beauty. Her gait is long, bold and sweeping, and she is, in the hands of a driver acquainted with her peculiarities, a perfect piece of machinery. She seldom makes an out-and-out break, but frequently makes a skip, and has been accused of losing nothing in either case. Aside from the distinction of having trotted the fastest mile on record, she also enjoys the honor of making the fastest three consecutive heats ever won in a race, which renders any comments upon her staying qualities unnecessary.

She continued on the turf until past twenty years old, and after completing that age she closed her public career with the year 1877 by trotting during that year forty-one heats in 2:30 or better, and making a time record of 2:14 1-2. Her record stands at the close of her career at 2:14, with 332 heats in 2:30 or better. Her record and her career are the marvel of the age.

DEXTER.

Dexter has been so often described, that the public are familiar with his appearance. A dark bay or brown gelding, with a white stripe the full length and width of his face, and four white legs; 15 hands, 1 inch high; his head as finely cut in its outline as that of Australian or Bonnie Scotland; an eye that does not stand out with the prominence of the Abdallah eye in Hambletonian, but one that sparkles with a glance of fire that speaks of that which is back of the orb; his mane and tail are medium in fulness, and in form and blood-like appearance he is hardly surpassed by that of any thoroughbred of full age in the country. His record of 2:17 1-4 is familiar to all.

JAY GOULD.

Jay Gould is a bright bay horse, of fine mould and finish, 15 hands 2 inches in height; rather light-appearing in form, but of great and powerfully formed quarters, and a tolerably fair set of limbs. His head is a finely formed one, and he has a face that indicates the high degree of intelligence that in so great a measure marks this branch of the family. He has trotted twenty heats in 2:30 or better, and reached a record of 2:21 1-2, and in addition is credited with one son, King Philip, a young horse only five years old, that has trotted nine heats in 2:30 or better, and reached a record of 2:21.

GLOSSARY OF SCIENTIFIC AND OTHER TERMS, WITH THEIR DEFINITION.

Abdomen—The portion of the body containing the stomach and intestines; the belly.

Abnormal—That which is not natural or regular.

Abortion—The casting of the young in an unnatural manner, and before the proper time.

Abrade, *Abrasion*—To rub off, to wear away by contact, as rubbing off the surface of the skin, producing galls.

Abrupt—Quick, sudden; an abrupt turn or twist in the intestine may produce strangulation of the parts.

Abscess—A swelling and its cavity containing pus or matter. A cavity containing pus.

Abscission—The cutting away or removal of a part.

Absorb—Swallowing up, drinking in.

Absorbent—In anatomy, those vessels which imbibe or suck up, as the lacteals or lymphatics. In medicine, any substance, as chalk, magnesia, etc., used to absorb acidity in the stomach.

Absorption—The taking up by the vessels of the body of any substance either natural or unnatural, as the serum of dropsical swellings.

Accelerate—Growing quicker or faster, as an accelerated pulse.

Acid—Sour. The last fermentation before the putrid.

Acidulate—To make slightly sour, as with lemon, vinegar, or the mineral acids.

Accretion—Increase, or growing as an exostosis or unnatural growth of bone.

Aceni—Stony growths of the liver, resembling berries.

Acrid—Sharp, pungent, biting, irritating, as the strong acids.

Acute—Severe, sharp. In diseases, those which soon come to an end in contradistinction to chronic.

Adhesion—A joining together, as the union of parts in healing.

Adhesive—That which adheres, as certain plasters.

Adipose—Fatty matter; belonging to fat.

Aerate—Mixing with air, as the blood in the lungs, by which it absorbs oxygen.

Affection—Disease, or disease of some particular part.

Affinity—The attraction which causes particles of bodies to adhere and form compounds. That which causes substances to cohere.

Albumen—Substances, animal and vegetable, resembling the white of an egg.

Aliment—Solid or liquid substance taken as food.

Alimentary Canal—The bowels.

Alkali—Any substance which will neutralize an acid, as magnesia, soda, potash, etc.

Alterative—A medicine changing the functions and condition of the organs of the body.

Analysis—To separate into parts, resolving into the original elements.

Anatomy—The art of dissecting, or separating the different parts of the body. The science of the structure of the body, as learned by dissection.

Anchylosis—The stiffening or rendering rigid a joint.

Anæsthetic—Agents which deprive of sensation and suffering, as chloriform, ether, etc.

Anodyne—A medicine to allay or diminish pain.

Anomalous—Deviating from the general character or rule.

Antacid—Opposed to or an antidote to acids.

Antagonism—Opposed in action; one contradicting another.

Anterior—Before; in front of another part.

Anthelmintic—Medicine to kill or expel worms.

Antidote—That which counteracts hurtful or noxious substances. A remedy to counteract the effects of poison.

Antiperiodic—Medicine to arrest or retard the return of a paroxysm in periodic disease.

Antiseptic—Agents for preventing, arresting or retarding putrefaction.

Anus—The fundament, or lower portion of the bowel at the tail.

Aperient—Laxative Medicine; that which gently operates on the bowels.

Approximate—Coming near to. An approximate cure is by inoculating for another disease.

Aqueous—Watery; having the property of water, as watery matter, aqueous pus.

Aromatic—Strong smelling stimulants, given to dispel wind and relieve pain.

Artery—Blood vessels which carry the red blood from the heart.

Articulate—Joining, working together or upon one another, as the bones.

Asphyxia—Death from strangulation of the lungs, from want of air.

Asthenopia—Weakness of the sight or vision.

Assimilate—To make like another; assimilation of food in the nutrition of the body.

Astralgalus—The largest bone of the hock-joint, lying below the os calcis.

Astringent—That which causes contraction of the bowels or vital structures. Astringents are medicines which suppress discharges, as from the bowels, blood, mucus.

Attenuate—To draw out, to make thin, reduce in size.

Atrophy—Wasting of a part, as the muscles.

Augment—To increase.

Auricle—The external part of the ear; also parts of the heart, one on each side resembling ears.

Balk—To refuse to pull, or to refuse to go forward at command.

Base—The lower part, as the base of the brain; the foundation.

Beneath—Under a certain part.

Biliary—Belonging to or pertaining to bile. Biliary duct, a canal containing bile.

Boot—Buffer, a leather band, worn to prevent one foot cutting the other in traveling.

Bougie—An instrument for opening the urethra, or urinary, or other passages.

Bounded—Parts lying about another: surrounded by.

Breeding-in-and-in—Breeding to close relations, in the same subfamily, as the produce of the same sire but of different dams, or of the same sire and dam.

Calcareous—Containing lime, lime like.

Calculus—Any hard, solid concretion found in any part of the body, as stone in the bladder, gall stones, etc.

Calefacient—Anything producing warmth.

Callous—Induration; a hard deposit; excess of bony matter.

Cancer—A hard, unequal, ulcerating tumor, which usually proves fatal.

Canker—Eroding ulcers of the mouth; virulent, corroding ulcers. Any sore which eats or corrodes.

Cannon-bone—The shank, or bone below the knee or hock. The metacarpal or metatarsal bone of the horse.

Capillary—Hair-like; applied to the minute ramifications of the blood vessels.

Capsicum—Cayenne pepper. The small, long red pepper.

Capsular Ligaments—Ligaments surrounding the joints.

Capsule—A membranous bag or sac.

Carbon—Woody matter. Charcoal is impure carbon; the diamond is pure carbon. Carbonic acid is expelled from the lungs in the act of breathing. Carbonic oxyde in the blood or lungs is fatal to life.

Caries—Ulceration of the substance of the bones.

Carminitives—Warming, stimulant, aromatic medicines, used in colic and wind.

Cartilage—Gristle; the substance covering the ends of bones, moving and working upon each other.

Castrate—To geld, emasculate, deprive of the testicles.

Catarrh—A cold attended with running of the nose.

Cathartic—Purgative medicine, used for freely opening the bowels.

Catheter—An instrument used for drawing the water from the bladder and for other purposes.

Caustic—Any burning agent, as potash, nitrate of silver. To cauterize is to burn, generally applied to the use of the hot iron in diseases.

Cavity—A depression, as the cavity of a wound.

Cellular tissue—The membrane or tissue which invests every fiber of the body, composed of minute cells communicating with each other, and which serve as reservoirs of fat.

Cephalic—Pertaining to the head.

Cerebral—Pertaining to the brain.

Cervical—The neck; belonging to the neck.

Characteristic—A symptom of character. Characterize, to distinguish.

Chemical—Relating to chemistry.

Chirurgical—Belonging to surgical art.

Cholagogue—Medicines to increase the secretion of the bile.

Chronic—A lingering, long-standing disease, succeeding the acute stage. A seated, permanent disease.

Chyle—The milky liquid, as taken from the food during digestion, and prepared from the chyme, and ready to be absorbed by the lacteal vessels before being poured forth into the blood.

Chyme—The food modified and prepared by the action of the stomach.

Cicatrice—The scar left after the healing of a wound or ulcer.

Circumscribed—Limited.

Cleft—A mark; division; furrow.

Clyster—Liquid medicine injected into the lower intestine.

Coagulate—To clot, as the blood when drawn.

Cohesion—Connected; adhering together; sticking together.

Coition—The act of copulation; union of the sexes.

Conception—Fecundation by action of the male.

Condition—A healthy, serviceable state of the system. A firm state of the muscular tissue.

Colic—A griping disease of the intestines.

Collapse—A falling together. A closing of the vessels.

Colon—The largest of the intestines, or more properly, the largest division of the intestinal canal.

Congenital—Born with another; of the same birth. Belonging to the individual from birth.

Congestion—An accumulation of clogged blood in the vessels, or in the parts, as the lungs, brain, etc.

Constrict—Drawing or binding together, as constriction of the muscles of a part.

Contagious—A disease that may be communicated by contact, or the matter communicated, or proceeding from the breath or emanations of the body.

Contorted—Twisted, twisting, writhing, as the body in pain, or from the result of disease.

Contusion—A bruise; a wound made by a blow or bruise.

Convex—Having a rounded surface. The opposite of concave.

Copious—Plentiful, abundant, as a copious discharge.

Coronet—The upper part of the hoof, just where it joins the skin.

Cranium—The skull. Cranial: pertaining to the skull.

Crest—The back or upper part of the neck of the horse.

Crupper—The buttocks of a horse.

Crural—Pertaining to the legs, as the crural arteries and the crural veins.

Crust—The hoof, so-called. The outside laminæ of the hoof.

Cul-De-Sac—A passage closed at one end.

Cutaneous—Of the skin, as a cutaneous affection.

Cyst—A small bladder or sac, applied to those containing parasites, which become encysted, or inclosed in an envelope.

Debility—The condition of weakness or feebleness.

Decoction—A fluid formed by boiling in water.

Decompose—The act of decaying. To separate into component parts.

Degenerate—To become worse or inferior.

Deleterious—That which is injurious, poisonous or destructive.

Delirium—Insanity; loss of the senses, or a wandering of them in disease.

Demulcent—That which sheathes and protects irritated surfaces.

Dermal—Belonging to the skin.

Dessicate—To dry. To make dry. Drying by heat.

Detergent—Medicines having the power of cleansing the vessels or the skin.

Develop—To increase. A disease develops its intensity. To show increasing muscular form. Bringing to perfection.

Diabetes—An excessive flow of urine containing sacharine matter.
Diagnosis—The distinguishing of one disease from another.
Diaphoretic—Medicines which cause perspiration or sweating.
Diaphram—The midriff. The membrane, or brain muscle, which divides the thorax or chest from the abdomen or belly.
Diarrhœa—A continued and profuse discharge from the bowels.
Diffuse—To extend or drive out. That which may flow or spread, as a diffusible stimulant.
Digestion—The separation and dissolving of the food in the stomach. Digestive ointment has the power of resolving tumors.
Dilate—To open wide, as dilation of the eye.
Dislocation—Putting out of joint.
Dilatation—The expanding of a body, as of the heart, arteries, the bladder, etc., from over-fullness.
Dilute—To make thin, as a medicine with water, with oil, etc.
Diminution—To make less, to decrease, as of pain.
Distort—Deformed, crooked, out of the natural shape.
Distend—To stretch out, or swell.
Diuretic—Medicines to increase the flow of urine.
Dorsal—Pertaining to the back. The dorsal column; the back-bone.
Drastic—Powerfully acting medicines or poisons.
Duct—A tube for conveying a fluid or the secretions of the glands.
Duodenum—The first portion of the small intestine, and through which the bile is poured.
Dysphazia—Difficulty of swallowing.
Dyspnœa—Difficulty of breathing.
Echolic—Parturients.—Agents causing the contraction of the womb.
Effusion—A flowing out, as of the blood, water or lymph, into the tissues.
Ejection—Casting out, as ejecting improper matters from the stomach.
Elastic—The property of springing or stretching.
Embryo—The impregnated ovum in the womb after growth has commenced.
Emetic—Medicines given to produce vomiting.
Emollients—Agents which have the power of softening or relaxing.
Enamel—The hard outer covering of the teeth.
Enema—Medicines given by injection into the bowels.
Enteric—Belonging to the bowels.
Enteritis—Inflammation of the bowels.
Epidemic—Disease that affects a large number, as though carried in the air.
Epiglottis—The covering of the glottis. A tongue-shaped projection, to prevent food or liquids from entering the wind-pipe.
Eruption—Pimples, blisters, rash, etc., breaking out on the skin.

Esophagus—The gullet, or tube of the throat which conveys food to the stomach.

Evacuate—To empty or pass out, as, to evacuate the bowels.

Ewe-necked—In the horse, having a neck like a shorn sheep.

Exanthema—Eruption of the skin with fever.

Excoriate—To tear or strip off the skin; to wear away or abrade; to break the skin in any manner, as in galling or with acrid substances.

Excrement—Refuse matter. The dung.

Excrescence—Unnatural or superfluous growth.

Excreting—Throwing out from the body.

Excrition—Separating the fluids of the body by means of the glands.

Exhale—Breathing out, evaporating.

Exostosis—Unnatural growth or projection of the bone.

Extensor-tendon—The tendons which stretch out the limbs.

Extravasate—To let flow from the proper vessels, as in bleeding.

Extremities—The limbs, so-called.

Exude—To discharge through the pores.

Facial—Pertaining to the face.

Faces—The excrement.

Farcy—A disease of the lymphatics of the skin of the horse. Also a disease allied to glanders.

Febrifuge—Medicines to lower the temperature of the body and counteract fever.

Feculent—Foul or impure matter, formed by the breaking down of the tissues, excrementitious matter.

Femur—The thigh bone proper.

Fermentation—Incipient decomposition of vegetable substances from souring.

Fibrin—An organic substance found in the blood and composing a large part of the tissues of the body. Fibrous membrane—a membrane composed of fibers.

Fibula—The small or splinter bone of the hind leg. The outer and lesser bone of the leg; much smaller than the tibia.

Fissure—An opening, a crack.

Fistula—A deep, narrow ulcer, having a pipe leading to it. *Fistulous.* Like a pipe.

Flatulent—The generation of gas or wind in the stomach and intestines, as in flatulent colic.

Flex—To bend, as the head, neck or limb; as a muscle flexing the arm.

Flexor—A muscle whose office it is to bend a part; in opposition to extensor.

Florid—Red or scarlet like, from excess of blood in a part.

Fomentation—The application of warmth and moisture, as with a liquid or poultice.

Forceps—Long pointed pincers or nippers.

Fracture—The breaking of a bone.

Friction—Exciting circulation by rubbing.

Fumigate—The application of smoke or vapor.

Function—The office or duty of any part of the body.

Fundament—The anus or extremity of the bowel. The end of the gut.

Fungus—An unnatural growth resembling mushrooms.

Gangrene—The mortification or death of any part of the body, or of any of its tissues.

Gas—An emanation, or invisible fluid, generated in the body.

Gastric—Pertaining to the stomach.

Gelatine—Animal jelly.

Gemelliparous—Producing two at a birth.

Generate—To beget offspring. Generative; employed in begetting or producing young; breeding.

Genital—Relating to reproduction of young, or to generation.

Gland—A structure for secreting certain fluids of the body, and containing a tube.

Glottis—The narrow opening at the top of the windpipe.

Granulate—Matter resembling grains, in the healing of wounds, and new flesh.

Gravid—The state of being with young.

Gullet—The œsophagus or food pipe leading to the stomach.

Haggard—Worn down; thin; ghastly; deathlike.

Hæmal—Relating to the blood.

Hæmatin—The coloring matter of the blood.

Haunch—That part of the body which lies between the last ribs and the thigh. In the horse, the bony region of the hips.

Haw—The process of the eye-socket, which is thrown over the eye to clear it of foreign substances.

Hectic—A constitutional and remitting fever exhibited in consumption; produced also by ulcers, sores, etc.

Hemorrhage—A discharge of blood from the vessels containing it.

Hepatic—Belonging to the liver.

Hepatized—Converted into a liver-like substance.

Hereditary—Inbred from the parents, as disease, color, vices and other peculiarities.

Hue—Color.

Humerus—The upper arm-bone; upper bone of the fore-leg.

Hysterics—A nervous disability, confined to females, sometimes attacking males.

Ileum—The lower part of the small intestine.

Incision—Cutting into, a clean cut, cutting as in any operation performed.

Induration—A hardening, as a hard tumor.

Incisors—The front teeth of the jaws.

Infection—Communicating disease by miasma or emanations from a diseased body.

Ingested—Food taken in.

Inject—To throw in artificially, as from a syringe.

Inoculation—Producing the same disease by virus or matter from a sore, communicated from one animal to another.

Instinct—Sense, as applied to animals.

Interfering—The cutting of one foot or leg with the other.

Interstice—The minute spaces between the particles of a body.

Intestines—The bowels. The alimentary canal leading from the stomach to the anus.

Invert—To turn about or upside down.

Invigorators—Strengthening medicines, or agents.

Jejunum—A part of the small intestines.

Jet—The peculiar flow of blood from the arteries, or spurting motion.

Jugular—The large vein of the neck.

Lacerate—To tear. A lacerated wound, is a torn wound.

Lachrymal—Pertaining to the tears. The lachrymal duct is the duct leading from the eye to the membrane of the nose.

Lamella—A small plate of anything; pertaining to the anatomy of the hoof.

Languor—Weakness, faintness, debility.

Laryngitis—Inflammation of the larynx.

Larynx—The swell at the upper part of the wind-pipe, and extending into the throat.

Lateral—At, or to the one side.

Laxative—A mild, loosening purgative.

Lens—A portion of the eye.

Lesion—Disease of a structure; any hurt or injury.

Ligament—The bands of the joints. That which binds together. The fibrous structure of the bones.

Lobe—A division of an organ, as of the brain, lungs or liver.

Local—Confined to a certain part.

Lubricate—To moisten, as the lubrication of the joints and moving parts by their appropriate fluids.

Lymph—A transparent and nearly colorless fluid. The fluid contained in and poured out by the lymphatics.

Lymphatic—The vessels of animal bodies which contain the lymph.

Macerate—Steeped almost to solution. Thorough soaking of a part in water previous to dissection.

Malady—Disease or ailment.

Malar—Pertaining to the cheek bone.

Malander—An ulcerous condition on the inside of the legs.

Malformation—Badly or unnaturally shaped or formed.

Malignant—Severe; long; dangerous disease.

Mediastinum—The partition formed by the meeting of the pleura, dividing the chest into two lateral parts.

Medullary—The marrow; pith; a soft substance.

Membrane—A thin animal tissue. Thin covering of the brain, bones and other organs.

Mental—Relating to the mind. The reasoning faculty.

Mesentary—The membrane which attaches the intestines to the spine.

Metastasis—The transference or removal of disease from one part to another, or such change as is succeeded by a solution.

Morbid—A state of disease; an unnatural state, as morbid humors; a failing, sinking state.

Mortification—The death of a part from gangrene.

Mucilage—A jelly-like fluid; one of the proximate elements of vegetables, abundant in slippery elm; the agent which lubricates the joints.

Mucus—The substance secreted by the mucous membranes, and effused upon the surfaces of the membranes, as the running of the nose in a cold.

Muscles—The lean or flesh; the organs producing the active movements of the body.

Narcotic—Drugs which allay pain and produce sleep.

Nauseants—Medicines that sicken the stomach.

Nephrites—Inflammation of the kidneys.

Nerves—The fibrous system, which convey sensations to and through the body.

Nervous—Having weak nerves.

Neutralize—Destroying the force or effect of anything.

Nitrate of Silver—Lunar caustic.

Nutritive—That which builds up; strong, healthy food.

Nutrition—The process by which the food taken is assimilated; to repair waste and promote growth.

Obesity—Exceeding fatness.

Oblique—Slanting.

Ocular—Relating to the eyes.

Omentum—The caul. A fold of the peritoneal membrane, covering the intestines in front, and attached to the stomach.

Optic—Relating to the sight, as the optic nerve; relating to the laws of vision.

Organ—The natural instrument by which a process or function is carried on.

Organic—Composed of organs. Organism. The living body.

Origin—The beginning or first existence of a thing.

Os—The technical name for bone.

Os Calcis—The tip of the back.

Osseous—Bone like.

Os Cheocele—Scrotal hernia. Any tumor of the hernia.

Ossification—Changing to bone. Bony formation.

Oxydation—The change formed by the action of air on any substance. The changing of the black or venous blood into red or arterial blood in the lungs.

Pabulum—That which is proper for food.

Pachydermata—A thick-skinned animal, as a horse, ox, man, etc.

Palate—The roof of the mouth.

Panacea—A supposed universal cure. A medicine applicable to many cases.

Pancreas—The narrow, flat gland extending across the abdomen, sometimes called callet or sweet-bread.

Paroxysm—In disease, a recurrence coming on after an intermission. Chills and fever are paroxysmal.

Parturition—The act of bringing forth young.

Patella—The knee pan.

Pathology—Pertaining to the nature and constitution of disease.

Pectoral—Pertaining to the breast, as the pectoral muscles. In medicine, that which is adapted to relieve affections of the breast and lungs.

Pectin—The gelatinizing principle of certain fruits and vegetables.

Pepsin—A substance secreted in the stomach of animals. The active principle in rennet.

Peptic—Promoting digestion; relating to digestion.

Pericardium—The serous membrane of the heart.

Perichrondrium—The membrane covering the cartilages.

Pericranium—The membrame lining the bones of the skull.

Periosteum—The fibrous membrane investing a bone.

Peritoneum—The serous membrane lining the cavity of the abdomen.

Permeate—That which may freely invest or pass through without rupture or sensible displacement. Water permeates sand; light permeates glass.

Pharynx—The opening or tube at the back part of the mouth which leads to the stomach.

Phlebotomy—The operation or act of bleeding.

Placenta—The membrane covering the young in the womb.

Plethora—A full habit of body; full of blood.

Pleura—The serous membrane lining the interior of the chest, covering the lungs, reflecting and lubricating them into its secretions.

Plexus—Any union of vessels, nerves or fibers in the form of net work.

Predispose—As likely to occur; inclining to, as being predisposed to disease.

Process—Prominence; a projecting part; any protuberance, eminence or projecting bone.

Profuse—Abundant, plentiful; as a profuse discharge.

Prognosis—The art of judging by the symptoms the probable course of a disease.

Prolapsus Uteri—Falling of the womb.

Prolapsus Recti—Falling of the rectum.

Pulmonary—Having reference to the lungs.

Pulsate—A beating or throbbing.

Pulse—The action or beat of the arteries.

Pumices—The letting down or falling of the coffin bone on the sole.

Puncture—Any orifice made with a pointed instrument.

Pupil—The ball or apple of the eye through which the rays of light pass to the chrystaline humors.

Purgative—Any medicine having the power of operating strongly on the bowels.

Pus—The matter flowing from a tumor when lanced, or from sores. Healthy pus is yellowish white in color and secreted in the process of healing.

Putrefaction—The act of decomposition; corruption; rotten.

Pylorus—The lower and right orifice of the stomach through which the food passes to the intestines.

Quiescent—At rest. Showing no pain. Making no sound.

Quack—A pretender in medicine. A charlatan.

Qualmish—Sickness at the stomach; nausea.

Quittor—An ulcerous formation inside the foot of the nature of a fistula.

Rabies—Madness; affected with hydrophobia.

Rachitis—Inflammation of the spine; rickets. This is a corruption of rachitis.

Ramify—Branched; running in various directions.

Rancid—A rank, strong smell. Incipient putrefaction.

Raphe—A seam or suture.

Receptacle—That which receives or contains another.

Rectum—The last intestine. The anal gut.

Refrigerant—Medicines or lotions to diminish heat.

Regurgitate—The act of throwing or pouring back, as wind.
Relax—To abate; become more mild, or less rigorous.
Remittent—Ceasing for a time, as a fever or a pain.
Reproduction—Producing again; breeding.
Respiration—The act of breathing.
Retention—Stopping, holding, as retention of the urine.
Retina—The part of the eye in which the image is produced in the act of seeing, or vision.
Rickets—A diseased state of the bones.
Repulsion—In physics, that power by which particles or bodies are made to recede from each other.
Reunion—The union of parts separated by a wound or accident.
Sacral—Belonging to the os sacrum.
Saline—That which is salt, or containing salt in solution.
Saliva—The secretion of the salivary glands, which moistens the food in chewing; also keeps the mouth and tongue moist. Salivation. The act of producing an increased flow of saliva.
Sanguinification—The process of producing blood from chyle.
Sanitary—Relating to the preservation of health.
Saphena—Major and minor—veins of the hind leg.
Scaphoid—Shaped liked a boat, as the navicular bone.
Sclerotic—The thick, hard, white outer coat of the eye.
Sciatica—A rheumatic affection of the hip.
Sear—To burn with a hot iron; actual cautery.
Secretion—The separation of various substances from the blood.
Sedative—Agents to depress nervous power, or lower circulation.
Sensorium—The seat of sensation. An organ which receives an impression. Sensitive, having feeling. Sensitive lamellæ, the lamellæ of the coffin bone.
Septic—Promoting putrefaction. The poison of dead bodies, in contradistinction to that of living ones called virus.
Serum—The yellowish watery portion of the blood remaining after coagulation.
Shank—The bone of the leg from the knee to the ankle.
Sialogogue—Medicine to promote the flow of saliva.
Sinus—An orifice or canal containing poison matter.
Slink—The act of aborting; producing young before the natural time.
Slough—(pronounced sluff.) To fall away, separate from in disease, as in or in mortified parts.
Sockct—The depression or process in which an organ works on another.
Soporific—Medicine to induce sleep.
Spasmodic—Spasms, as cramping, fits, etc. Colic pains recurring at intervals.

Spinal—Relating to the back-bone or spine.

Splint—An excrescence in the shank-bone. Splint-bone, one of the bones of the leg.

Spontaneous—A growth occurring without apparent cause.

Sporadic—Separated, scattered; occurring here and there, as sporadic causes of disease.

Sternum—The breast-bone.

Stimulants—Agents to temporarily excite the nervous or circulatory system.

Stomachics—Agents to promote digestion.

Strangulated—Chocked; stoppage of the circulation in any part.

Strangury—Stopping of a passage.

Stricture—Stoppage or obstruction of a passage of the body, by morbid or spasmodic action.

Stupor—A dull, sleepy, stupid sensation. Loss of sensation.

Styptic—An astringent having the property of restraining or stopping bleeding.

Sudorific—That which will cause perspiration or sweating.

Suppuration—The process of forming pus or matter; the result of inflammation.

Suture—A stitch or fastening on joining together.

Symmetry—Well proportioned, handsomely and stoutly formed.

Synovia—A fluid resembling the white of an egg, secreted at the joints and articulations, for the purpose of lubricating them. Joint-oil, so called.

Tegument—A covering. The skin. Integument, a membrane or skin, which invests a particular part.

Tendon—The dense, fibrous structure in which a muscle ends, and by which it is joined to a bone.

Tent—A pledget or plug introduced into a wound.

Tenuity—The property of being thin, as rarified air.

Tergal—Belonging to the back. Tergum, the back.

Testicle—The seed. The gland containing the seminal fluid.

Therapeutic—That part of medicine which relates to the discovery and application of remedies for diseases. The use of diet and medicines.

Thorax—The chest, or that part of the body between the neck and abdomen.

Tibia—The large bone of the hind leg.

Tonic—Agents which gradually and permanently improve the system.

Tonsil—An oblong gland situated on each side of the fauces, terminated by the larynx and pharynx, at the rear of the mouth and having excretory ducts opening into the mouth.

Torsion—Twisting. The act of turning or twisting, as in drawing a tooth with the turnkey.

Trachea—The windpipe.

Tractile—That which may be drawn out.

Tread—Tramping upon, as the tread of one hoof upon the other. The part of the hoof resting on the ground.

Tuber—A rounded projection of a bone.

Tubercle—A small tumor, as tubercles in the lungs.

Tumor—A swelling or enlargement, generally applied to those which are permanent.

Ulcer—A running sore.

Ulna—The larger of the two bones of the arm.

Ulterior—Beyond a time or division. A last result.

Unciform—Curved or crooked, as a clam or the finger nail.

Ureter—The tube or canal conveying the urine from the kidneys to the bladder.

Urinary—Pertaining to the urine.

Uterus—The womb.

Vascular—Pertaining to the vessels of animal and vegetable bodies, as the vascular functions. The arteries, veins, lacteals, and the like, compose the vascular system. Animal flesh is vascular. Highly organized.

Venesection—Letting blood by opening a vein.

Venous—Pertaining to the veins, or contained in the vein.

Ventral—Pertaining to the abdomen or belly.

Vermifuge—Medicines or agents to kill or expel worms.

Vertebra—A division or separate bone of the spinal column.

Vertex—The top of the head.

Vesicle—A small blister. Any membranous cavity.

Villi—Fine, small fibres. Villous, abounding with minute fibres, as the inner mucous membrane of the stomach and intestines, called the villous coat, from its abounding with villi or minute hairs.

Virulent—A dangerous disease; poisonous.

Virus—Contagious or infectious matter.

Viscera—The organs contained in any cavity of the body, particularly of the head, thorax and abdomen.

Viscid—Any gluey, sticky or tenacious substance not easily separable.

Vision—The act of seeing.

Vital—Having or containing life. Necessary to life.

Vivify—To bring to a vital state.

Vulnerary—Plants, lotions, ointments, drugs or other substances useful in the healing of wounds.

Wale—To move slowly on the feet, as in walking.

Wane—To decrease, as in a fever.

Warbles—Small, hard tumors on the back of a horse, from irritation of the saddle. The tumor occasioned by the depositing of the eggs of the gad fly in the backs of horses and cattle.

Warts—Spongy excrescences on various parts of the body.

Whining—To utter the call of the horse. To neigh.

Withers—The high process of the vertebra between the back and neck.

Xerodes—Any tumor attended with dryness.

Xeromyrum—A dry ointment.

Xerotes—A dry habit of body, a dry disposition.

Xiphoid—Sword-like. A small cartilage at the bottom of the breast-bone.

Xyster—A surgeon's instrument for scraping bones.

Yeasty—Frothy, foamy, spumy; as yeasty pus or matter.

Young—The offspring of animals.

Zarnich—A name applied to the native sulphurett of arsenic, sandarach, or realgar, and orpiment.

Zein—The gluten of maize.

Zig-zag—Having very short turns.

Zoology—That part of natural history which treats of the structure, habits, classification and habitations of animals.

Zoonomy—The science which treats of the phenomena of animal life, their causes and relations.

Zygomatic—Pertaining to the bone of the head, called also os yagale or cheek-bone, or to the bony arch under which the temporal muscle passes.

ILLUSTRATIONS

PAGE.

Horse, skeleton of 23
" longitudinal section of 26
Horse's head, vertical section of 27
Horse, bones of the foot 28
" " " " sectional view of 28
" foot and lower leg, vertical section of 29
" external parts of 30
Good farm or every-day horse 40
Light hunting horse 42
Heavy " 43
English roadster 44
" coach horse 45
" race horse, Eclipse 51
Norman Percheron stallion 57
" " mare 59
Shetland ponies 67
Shales 75
Dervish 76
Golddust 77
Poitou ass 85
Horse's head with bearing-rein 100
" without " 100
Team of the cruel and improvident master 122
" " kind and careful master 123
Barn of the provident master 125
Farmer Unthrift's barn 126
" " home 126
The barn of the cruel master 127
Model halter on model colt 127
Team of the kind master 128
" " cruel master 128
Shiftless man's door-yard gate 128
" " field gate 128
High-bred roadster 132
Finely bred roadster 133
Good family horse 134
Proportions of the horse 135
Cleveland Bay 137
Goldsmith Maid 140
Movement in trotting 142

PAGE
Fine trotter in light harness 144
Good form for saddle horse 145
Horse of good action 146
Model form for speed in running 148
Progression of blind horse 151
Movement in walking 156
Side and front view of heads, good 162
" " " bad 163
Side view of fore-quarters, showing good shoulder 164
" " " bad conformation 166
Front view, showing breast and limbs, good 167
" of fore-quarters, showing bad conformations 169
Good hind-quarters 172
Side view of hind-quarters 174
Back view of hind-quarters 175
" " bad 176
External manifestations of disease 184
First stage of confirmed grease exudation 191
Second " " " 191
Horse affected with surfeit 199
One of the causes of hide-bound in horses 205
Poll-evil during first stage 216
" " second stage 217
Slight enlargement, which may end in fistulous withers 220
Fistulous withers, worst stage 220
A fit subject for founder or bronchitis 249
A horse dressed for bronchitis 250
A cough of incurable bronchitis 252
Case of congestion 252
Position assumed by horse with an attack of pneumonia 253
Horse's head with cold 258
" " " lymphatic gland swollen 259
" " " the throat blistered 261
Seton in the throat of a horse 261
A horse quidding 262
The act of coughing 262
Bit bearing upon jaw 266
Confirmed influenza 267
Opening the abscess of strangles 271
The first stage of spasmodic colic 274
The second stage of " " 274
The third stage of " " 275
The first stage of flatulent " 276
Horse dying of flatulent colic 276
Æstrus hemorrhoidalis 287
" eggs, larvæ and fly 278
Nose strained upward 280
Application of an ammonical blister 281
Horse suffering from acute gastritis 282
Unnatural attitude indicative of abdominal injury 286
Position assumed by horse suffering from abdominal injury 286
Test for hemorrhage of the lungs 288
Colt picking hair from its leg, giving proof of worms 289
Symptoms attending disease of urinary organs 295
Test for inflammation of the kidneys 296

PAGE.
Horse suffering from bloody urine 298
Position assumed by horse having albuminous urine 299
Horse suffering with tooth-ache 308
Burning for lampas 309
Effects of cruel use of bit 311
Aptha 312
Countenance of a horse with rabies 328
Destructive impulse of hydrophobia 329
Horse during the mad stage of staggers 332
Expression characteristic of megrims 337
A horse dying with abscess within the brain 342
A horse mad from inflammation of the brain 342
Test for tetanus 347
Slings for tetanus or fractured limb 348
Mode of feeding horse with chronic tetanus 349
Showing how far a horse with tetanus is capable of motion 349
Horse having string-halt 352
Mode of blinding a horse and applying lotion to the eye 358
Extirpation of the eye 360
Obstruction of the lachrymal gland 361
Eye effected by gutta serena 362
Foot, incapable of being raised from ground by reason of spavin 367
Natural position of foot when raised from the ground during an easy trot 367
Closing crack in hoof 381
Acute fever in the feet 385
The low choke 404
Manner of using seton needle 406
A horse suffering from drastic poison 410
Tumor caused by curb chain 420
How to hear the sound made in a horse's windpipe 424
Internal hemorrhage 425
Horse suffering from partial paralysis of the hind legs 426
Teeth of ox at age of five years 449
Section of head of ox 449
Devon ox 449
Devon bull 450
North Devon cow 453
Devon working ox 455
Hereford bull 458
Hereford cow and calf 461
Sussex cow 464
Durham bull and cow, old style 466
Shorthorn cow, in outline 468
" bull 471
" cow, "Gala" 473
Yearling Shorthorn bull 475
Shorthorn cow, "Diana" 476
" bull, "Hiawatha" 479
" cow "Rosamond" 480
Points of Shorthorn bull 482
Jersey bull, "Comet" 492
A trio of Jerseys 494
Model cow, perfection, points illustrated 497
Jersey bull " " " 499
Jersey cow 501

PAGE.
Jersey heifer 502
Modern Ayrshire cow 505
Holstein cow 523
Holstein heifer 525
Holstein bull 530
" " of the Chenery milking stock 535
Polled Angus cow 539
A Texas steer 542
Modified Texans, or Cherokee cattle 544
Working by main force 571
Results of bad handling 574
" of good handling 575
To prevent a cow from kicking 577
" " sucking 577
Harness to prevent sucking 578
To prevent hooking 578
A primitive tackle, but good trainer 579
Old style farm yard 584
Farmer Thriftless' mode of protection 585
" Thrifty's mode of protection 585
Primitive protection 585
Main floor of dairy barn 588
Plan of stables in basement 590
Cattle-feeding basement 590
Basement of dairy barn 591
A pastoral scene 599
Earl Spencer's prize ox 624
Outline of fat bullock 626
Milk mirror of Jerseys 630
Great milk mirror on Holstein cow 632
Ground plan of model creamery 545
Application of steam to the nostrils 667
Nose bag for steaming 668
Malignant catarrh, second or sloughing stage 695
Skeleton of the ox 698
Points of sheep 716
Leicester ewe and lamb 717
Leicester ram 718
Sheared Cotswold ram 721
Group of Cotswold ewes 720
Sheared Cotswold ewe 722
Yearling Cotswold 723
Cotswold ewes 723
New Oxfordshire ewe 724
Black-faced Highland sheep 725
Highland sheep 726
Dorset ram 727
Southdown ram 729
Hampshire Down 728
Shearling Oxford Down 729
Group of American Merinos 730
Merino ram 732
" ewe 733
Division of wool 734
Convenient feeding trough for sheep 740

PAGE.
Allowed to shift for itself..... 741
Wintered with good shelter and feed..... 741
Skeleton of Leicester sheep..... 747
Skull of a polled sheep..... 749
Head of sheep, vertical section..... 749
A bad case of scab..... 756
Old China boar..... 768
China sow..... 769
Berkshire boar..... 771
Essex boar..... 773
Short-faced Lancashire hogs..... 776
Poland-China boar..... 778
Chester white hogs..... 780
Improved Cheshire..... 782
Backwoods hog..... 785
Berkshire sow, breeder..... 789
Hazel splitter, sow..... 790
Breeder in good flesh, sow..... 797
Arkansas tooth picks..... 798
Skeleton of the hog..... 803
Creve Cœur cock and hen..... 819
Mexican wild Turkey..... 820
Embden or Bremen geese..... 821
Aylesbury ducks..... 823
Gallus Sonneratii..... 324
Head of single-wattled Brahma fowl..... 825
" Breda or Gueldre..... 825
White Dorking cock..... 828
Gray English Dorkings..... 829
Dominique fowl..... 830
Plymouth Rock fowls..... 831
Bucks County (Pa.) fowls..... 832
Black Hamburg fowls..... 833
Golden-pencilled Hamburgs..... 834
Silver penciled Hamburgs..... 835
White Leghorns..... 836
Standard White Leghorns..... 837
Black Spanish fowls..... 838
Houdan hen..... 839
La Fleche fowls..... 840
Creve Cœur fowls..... 841
Buff Cochin cock..... 842
" " hen..... 843
Partridge Cochins..... 844
White Cochin fowls..... 846
Dark and Light Brahmas..... 847
Pair of Silky fowls..... 849
Breda cock and hen..... 850
Brown Breasted Red Game..... 851
Earl Derby Game..... 852
Duck Winged Game fowls..... 853
White Georgian Games..... 854
Seabright Bantams..... 855
Barren Full-feathered hen..... 856

PAGE.
Japanese Bantam cock 857
" " pullet 857
Points of poultry 859
Points of head of cock 859
Analysis of wing plumage 860
Points of the fowl 861
Illustration showing points 862
Breeding to type 864
Fountain for poultry 870
Wild turkey 872
Common turkey 873
Ocelated turkey 874
Bronze turkey 875
Guinea fowl 876
Peacock 877
Rouen duck 879
Aylesbury and Rouen ducks compared 880
Gray Call ducks 881
Cayuga Black ducks 882, 884
Black East India ducks 883
Aylesbury ducks 885
Embden geese 887
Toulouse geese 888
Hong Kong geese 879
White China geese 890
African goose 891
Anatomy of the hen 898
Bone of leg and foot of fowl 898
Back of the barn 902
Chart for telling age of horses (49 illustrations) 36
Chart for telling age of cattle (13 illustrations) 448

INDEX

PAGE.

Abusing a faithful servant..... 121
Abuse of the hoofs..... 124
Abortion in mares..... 80
Abdominal cavity, wounds penetrating 404
Abortion, causes of..... 81
" preventatives of..... 81
" to prevent..... 81
Absorbents, inflammation of..... 324
" " of and recipes 325
Abscess within the brain.....841, 343
Acute inflammation of feet..... 386
Acute irritation of the skin..... 419
" " " " " recipe..... 419
Action, styles of..... 155
Age of horse..... 31
Age of the mule..... 35
Age for breeding horses..... 72
Age to train a colt..... 89
Alteratives..... 428
Ale for tired horses..... 115
America, introduction of the h r s... 19
American semi-wild horse..... 39
American vs. English foals..... 87
American wild horse..... 56
" thoroughbred horse..... 61
Ambling..... 100
Antiquity of the horse..... 17
Antiquity of cattle..... 18
Anæsthetics..... 429
Antiseptics..... 430
Anus, soreness of..... 283
Ancient Greek horse..... 168
An infallible rule..... 230
Anodynes..... 434
Apparatus, to keep.....443, 444
Apoplexy 338, 341
" recipes.....340, 441
Aptha..... 312
" recipes..... 312
Ariel..... 141
A nerved horse..... 158

PAGE.

Arabian horse..... 47
" " striking points..... 48
" " color of..... 49
" " first importation..... 50
Arteries, enlargement of..... 320
Astringents..... 330

Barbarities practised..... 122
Bad usage vs. good usage.....123, 124
Balking and backing..... 149
Balking..... 159
Bad heads, explanation of..... 164
Back teeth of horse..... 32
Back furrowing..... 102
Barbary horse..... 53
Bellows..... 296
" recipes..... 267
Bites..... 419
Big Head and Bigjaw.....363, 365
Blanketing..... 119
" when necessary..... 119
Blindness..... 150
Blind horse, movement of..... 151
Blood horses..... 161
Bleeding from the nose..... 270
Blind teeth..... 307
" staggers.....334, 338
Bladder, sand like deposits in..... 300
" inflammation of..... 302
" " " recipes..... 302
" rupture of..... 303
Blood spavin..... 344
Bleeding.....415, 416
Black pigment, tumors..... 418
Bog spavin.....344, 345
" recipes..... 365
Bone spavin.....367, 369
" recipes.....368, 369
Bones of the feet..... 28
Box stalls..... 107
Bots, recipes..... 279

PAGE.

Bishoped teeth..... 150
Biting..... 159
Bitting, harness.....89, 90
" bridle.....89, 90
Bots.....277, 278
Bot flies.....278, 279
Bolting..... 159
Body and limbs of horse, explanation of.....164, 167
Body of the horse in front..... 198
Bone spavin..... 149
Breeding up, how to..... 132
Broken wind..... 158
Breaking down..... 158
Broken wind..... 158
" " thick wind..... 158
Broken knees..... 158
Bronchitis..... 249
" causes..... 249
" how to know it..... 250
" what to do.....250, 252
" recipes.....250, 251
Broken wind..... 265
Breeding, importance of..... 70
" draft horses..... 77
" in-and-in 74, 78
Breeding of mules..... 84
Brain, abscess within.....341, 343
Broken wind..... 424
Brook water..... 113
Brush, the..... 117
Brushes..... 119
Brushing or speedy cut.....397, 398
Broken knees.....399, 398
Broken hock..... 406
Buying a trotting horse..... 139
Buying cheap horses..... 153
Buying for blood..... 178
Burns..... 401

Cattle, antiquity of..... 18
Canadian horse..... 64
Cranium, importance of..... 28
Calmuck horse..... 37
Care necessary in training..... 93
Carriage of the body in riding..... 98
Canter..... 101
Carrying the reins in plowing..... 103
Carriage floor..... 107
Care of the feet..... 118
Care of the frog..... 119
Careful man's theory, the..... 127
Causes of abortion..... 81
Captain McGowan..... 141
Cataract..... 159

PAGE.

Cataract..... 357
" recipes..... 357
Caries of the lower jaw.....376, 378
" " " " recipes..... 377
Canker.....387, 388
" recipes..... 388
Cartileges ossified..... 394
Capped elbow.....399, 341
Cancer, epithelial..... 418
Catharties..... 430
Carminative..... 431
Caustics..... 432
Castration, time for..... 414
" how performed..... 415
Chinese horses..... 37
Characteristics of Canadian horse..... 54
Changing the leading foot..... 101
Chopped feed..... 115
Cheap structures available..... 129
Chest founder.....249, 248
" recipes..... 249
Chronic cough..... 262
" recipes..... 263
Chronic gastritis.....283, 284
" recipes.....283, 284
Choking.....402, 404
Cistus calculi..... 300
Cleveland bay horse..... 45
Clydesdale horse..... 46
Cleaning the stable..... 108
Cleaning the horse..... 117
Cleaning horses..... 118
Cleveland Bay.....138, 139
" improvement in 139
Colts' teeth.....31, 32
" milk teeth..... 32
Colors of Arabian horse..... 50
Colts, how to raise..... 81
Colts' starveling..... 82
" stabling..... 82
" feeding..... 82
" handling..... 82
Colt, educating the..... 88
" at weaning time..... 88
" first lesson..... 88
" haltering a wild..... 88
" training a..... 89
" age to train..... 89
" training to work..... 89
" how to handle..... 90
" learning to back..... 90
Colt, handling a vicious..... 92
Colts, saddling and harnessing..... 94
Colts, Winter feed of..... 112
Color in horses..... 154

PAGE.
Colds, what to do.....259, 258
" recipes 259
Colic, spasmodic..... .....273, 274
" " recipes.....276, 277
" flatulent..... 276
" " recipes.....276, 277
Colon, inflammation and rupture of.279, 281
Connestoga horse..... 66
Control of stallion necessary..... 105
Comfortable shelter economical..... 106
Construction of stables..... 106
Corns 158
Cough..... 159
Conqueror..... 142
Combs..... 119
Conformation in perfect and imperfect horses.....164, 165
Cow hocked horse..... 173
Consumption..... 254
" how to know it..... 255
" what to do.....256, 255
" how to prevent..... 256
" recipe..... 255
Constitutional lymphangitis..... 324
Corns.....382, 384
" recipes..... 383
Contraction of the hoof..... 384
" recipes..... 403
Contused wounds..... 404
Counter irritants..... 431
Cruel care..... 128
Crib-biters, wear of teeth in..... 35
Crib biting..... 149
Crib biting..... 159
Cracked heels..... 190
" " how to know..... 191
" " what to do..... 191
Crib biting..... 308
Cramps..... 350
" recipes..... 350
Cracked hoofs.....381, 382
" " recipes..... 382
Cut feed..... 114
Curry comb..... 117
Curry comb..... 119
Cunning servants..... 130
Curb 149
Curbs 158
Curb 345
" recipes for.....345, 346

Decay of the teeth, causes of..... 307
" " " how to know it... 307
Demulcents 432
Deodorizers..... 433
" recipes..... 433

PAGE.
Dentition or teething..... 306
" what to do..... 306
Deceptions practised in teeth of horse 35
Descendants of the Darley Arabian.... 52
Descent of Norman Percheron horse 58
Dervish..... 74
Dexter 143
Definition of unsoundness or vice..... 159
Dgelfe horse..... 47
Difficulty of breathing..... 265
Diaphram, spasm of..... 285
" recipes 285
Diarrhea..... 290
" recipes.....291, 292
Diabetes or profuse staling..... 297
" " " causes..... 297
" " " how to know 297
" " " what to do... 297
" " " recipes..... 297
Dimness of vision..... 358
Diaphramatic rupture..... 402
Dislocations..... 406
Distortions..... 406
Diseases of the ear.....408, 409
Division of the tendons..... 417
Diaphoretics 432
Diuretics..... 432
Disinfectants..... 433
Dissection 437
Dish hoofs..... 152
Diseases of the skin and sub-cutaneous tissues.....187, 222
Distemper 236
" how to know it 237
" what to do..... 237
" recipes.....237, 238
Doses, graduating..... .....441, 442
Dongola horse..... 55
Dratt horse of Vermont..... 64
Driving horses..... 155
" " colors of..... 155
Dropsy of the lungs..... 418
Description of the ancient Greek horse..... .....168, 170
Dropsy of the heart..... 241
" " " recipes..... 242
" " brain 242
" " " recipes..... 242
" " chest..... 243
" " " recipes..... 243
" " skin of the chest..... 245
" " abdomen..... 246
" " " recipes..... 247

Early importation of thoroughbreds.. 61
Ear, diseases of.....408, 409

PAGE.
Eclipse 136
Economy of shelter 106
Educating the colt 88
Egyptian horse 55
Elaine 143
Elbow, capped 399, 400
Emetics 432
Enlarged glands 259, 260
Enlargement of the spleen 294, 295
" " " heart 319
" " " arteries 320
Enlargement of the hock 369, 370
English roadster 44
" thoroughbred horse 50
Epiglottis, spasmodic actions of 268
Epithelial cancer 418
Ethan Allen 134
European horse 38
Exostosis of the lower jaw 420
" " " " " recipes 420
Expectorants 434
Explanation of good heads 161, 164
" " bad " 161, 164
Explanation of body and limbs of horse 164, 165, 166, 167
External manifestations of disease, explanation of 184, 184
Eye, worms of 358
" fungoid tumors of 360, 359

Farm training track 104
Farm stable 109
Farmer Unthrift's barn 126
" " home 126
Family horses 134
Fatty degeneration of the heart 319, 320
False quarter 389
Falling off of hair 419
Farm horses, proper stature 41
Fastest time trotting, from one to one hundred miles 141, 143
Fast walking horses 155
Farcy and glanders 158
Farcy 230
" causes 231
" how to know it 232
" what to do 333
" recipes 234
Feeding colts 82
Feed bins 107
Feeding 111
" roots 112
Feed of slow work horses 112
" " fast " " 112
Feeding grain 117
Feet, care of 118

PAGE.
Fever 317, 318
Finely bred roadster 132
Fistula of the parotid duct 313, 315
Fistula 219
" causes 219
" how to know it 220, 221
" what to do 221
" recipes 221
Flora Temple 141
Flexibility 160
Flexing the horse 91
" " jaw 91
Flatulent colic 276
" " recipes 277
Foals, American vs. English 87
Foul sheath 303
Food, kinds and quantities of 114
Founder 385, 287
" recipes 386
Foot lameness 152
Founder 158
Form and symmetry 160
Fore-quarters, showing bad conformations 170
Fresh food, important 115
Frog, care of 119
Fungoid tumors of eye 359, 360
Frog, injuries to 384, 385
Frost bite 400, 401
" " recipes 401
Fractures 407
French horses 38
Fridi horses 48
Fungus collar tumor 208
" " " causes 208
" " " how to know, 220, 221
" " " what to do 209
Functional diseases of the liver 288

Galloping 101
Gastritis, chronic 283, 284
" " recipes 283, 284
Getting correct information 131
General utility horse 135
Gen. Butler 143
Gestation, treatment of during 79
Girda 141
Glass eye 150
Glanders, causes 223, 224
" how to know 224, 225, 226
" what to do 227, 228, 229, 230
Gold dust 76, 77
Good shelter, value of 125
Good farmer's surroundings 125
Good care described 127
Goldsmith Maid, her performances 141

PAGE.

Gov. Sprague..... 143
Good head, explanation of.....161, 164
Gorged stomach..... 286
" " recipes..... 286
Graduating doses.....441, 442
Gravel..... 300
Granary..... 100
Grooming..... 111
Gruel, how to make..... 115
Grain should be clean..... 117
Great Eastern..... 143
Grease and mange..... 158
Grease, causes..... 190
" how to know it.....191, 192
" what to do..... 190
" recipes for..... 192
Guttacarina..... 361
" recipes..... 362

Haw or hooks.....357, 358
" recipes..... 358
Hair, falling off of the..... 419
" " " " " recipes..... 419
Hardening of the skin..... 420
" " " " recipes..... 420
Hamstring, rupture of..... 424
Handling colts..... 82
Haltering a wild colt..... 88
Harness, bitting.....80, 90
Harness, training to..... 91
Handling a vicious colt..... 92
Harnessing and saddling colts..... 94
Harness, horse..... 99
Hand gallop..... 101
Harness room..... 107
Hay, quantity to feed..... 115
" and straw, value of..... 116
Heaves.....265, 266
" recipes..... 266
Heart, enlargement of..... 319
" fatty degeneration of.....319, 320
Hernia.....401, 402
" of the mesentery.....401, 402
" ventral..... 402
" omentum..... 400
Hemorrhage, internal..... 425
Head, bad form..... 161
" side view of, good..... 171
" front view of, good..... 161
" side view of, bad..... 161
" front view of, bad..... 161
Hide bound..... 204
" " causes..... 204
" " how to know it..... 205
" " what to do..... 206
" " recipes..... 206

PAGE.

High bred roadsters..... 132
High bred hunting horse..... 147
High blowing.....421, 423
" " recipes..... 423
Hip sweeny..... 366
Horse, cleaning the..... 117
" cloths..... 117
Horses, cleaning of..... 118
Horse pails..... 119
Horse, light harness..... 143
Horse, fast walking..... 155
Horse, what he should be..... 157
" shoulder..... 157
" upper arm..... 157
" the knee..... 157
" the shank..... 157
" the cannon bone..... 157
" the pastern joints..... 157
" hoofs..... 157
Horse, the hackney..... 43
Horse, Turkoman.....37, 54
" Calmuck..... 54
" Tartary.....37, 55
" Turkestan.....34, 38
" Europe..... 38
" Iceland..... 38
" Italy..... 38
" France..... 38
" Normandy..... 38
" Norman Percheron..... 38
" Spanish Barb..... 39
" semi-wild, of America..... 39
" the good farm horse..... 39
" the English roadster..... 44
" the heavy draft..... 45
" the Cleveland Bay..... 45
" the Suffolk Punch..... 46
" the Vermont draft..... 46
" the Arabian..... 47
" the Dgelfe..... 47
" the Scealoni..... 47
" the Mefki..... 48
" the Sabi..... 48
" the Fridi..... 48
" the Nejdi..... 48
Horses of slow work, feed..... 112
" " fast " feed..... 112
Hours of feeding..... 113
Hoofs, abuse of..... 124
How to breed up..... 132
Horses for great speed..... 148
Horse, view from behind..... 175
" hind quarters, bad..... 176
" what not to buy..... 177
" perfect, not plenty..... 177
Hock, enlargement of.....369, 370

	PAGE.
Horse, antiquity of	17
" brought to America	19
" where found	19
" preserved in his purity	19
" framework of	21
" summary of parts	25
" general explanatory terms	27
" head, explanation of	27
" foot and lower leg, explanatory terms	29
" external parts, explanation of	30
" age of	31
" incisors furnish indication	31
" back teeth of	32
" incisors	32
" " how composed	32
" teeth, wear of	32
" " the mark	33
" number of teeth	33
" wolf teeth	33
" when teeth are perfect or mature	34
" deceptions practiced in teeth	35
" teeth, vocabulary of	36
" Chinese	37
" Indian	37
" Japan	37
" Siam	37
" Persian	37, 54
" age for breeding horses	72
" principles of transmission	73
" relative size of sexes	73
" selection, value of	73
" in-and-in breeding	74
" cross breeding	74
" Dervish	74
" Marshland Shales	74
" Gold dust	76, 77
Horse, body and limbs, explanation of	164, 167
" front view of	168
" front of	168
of Ancient Greeks	168
" fore-quarters, showing bad conformations	170
" hind quarters, showing bad conformations	170
" illustrations of fore quarters	171
" good hind quarters	172
" to examine	173
" cow hocked	173
Horses, draft, breeding	77
How to raise colts	81
How to handle a colt	90
Horse, flexing	91
" to handle	92

	PAGE.
Horse, vicious, to subdue	95, 96
" working	97
" breaking to work	88
" training to trot	98
Horse, the quarters	157
" " hams	157
" " hocks	157
" " back	157
" " withers	157
" " shoulder-blade	157
" " croup	157
" " barrel	157
" " chest	157
" " neck	157
" " physical structure of	157
Hoofs, cracked	381, 382
" " recipes	382
" rot	382
" contraction of	386
Huntress	141
Hunting horses	41
Hunting horse, high bred	147
Hydrophobia	327, 331
Iceland horses	38
Importation of Arabian horse, England	50
Importance of breeding	74, 78
Importance of large jacks	85
Importance of fresh food	115
Information, correct	131
Improvement in Cleveland Bays	139
Interfering	152
Inflammation of the lungs, causes	252
" how to know it	253
" what to do	254
Influenza, how to know it	267
" what to do	268
" recipes	268
Inflammation of the colon	279, 280, 281
" " " stomach	282, 283
" " " " peritoneum	287
Intestation of intestines	287
Intestines, parasites infesting	289
" " " recipes	290
Incisors of the horse	23
Indian horse	37
Indian pony	68
Italian horses	38
Jacks, importance of large	85
Jaundice	293, 294
" recipes	294
Jaw, flexing the	91
John Stuart	143
Judge Fullerton	143

PAGE.
Judging horses..... 178
Jugular vein, inflamed..... 320
" " " recipes.....322, 323

Kadischi horse..... 48
Kaihan horse..... 48
Keene Jim..... 143
Kemble Jackson..... 143
Kicking.....149, 159
Kidneys, inflammation of.....295, 296
" " " recipes..... 296
Kinds and quantities of food..... 114
Knee joint, inflammation of..... 376
" broken..... 398
Know what you breed for..... 131
Know what you buy for..... 143
Kochlani horse..... 48

Laying out lands..... 102
Lake water..... 113
Lady Mack..... 141
Larva in the skin..... 212
Laryngitis, causes..... 260
" recipes..... 261
Lampas..... 309
Lachrymal gland, impediment of...360, 361
Lacerated wounds..... 405
Large Jacks, importance of..... 85
Leading foot, changing the..... 101
Leucorrhea, catarrh of the womb..... 305
Light harness, training to..... 101
" " trotting..... 101
Linseed meal..... 116
Light harness horses..... 143
Liver, functional diseases of..... 288
" congestion of..... 288
" inflammation of..... 289
Lime or white urine..... 300
Lock jaw.....347, 350
Lower jaw, caries of.....376, 378
" " " " recipes..... 377
Lower jaw, exostosis..... 420
Loose boxes in stables..... 107
Longfellow..... 143
Lula..... 142
Lungs, dropsy of..... 418
Lymphangitis..... 324

Mare, number of teeth..... 33
Mare, treatment during gestation..... 79
" when in season..... 79
Mares, care of after being served..... 79
Mare, to know when in foal..... 80
" " " time of foaling..... 80
Marshland shales..... 74
Mares, treatment..... 79
Mangers..... 107
PAGE.
Mashes, how to make..... 115
Manure fork..... 120
Mange..... 200
" how to know it..... 201
" what to do..... 201
" recipes..... 202
Malleuders..... 215
" recipes..... 215
Malignant epidemic..... 264
Mad staggers.....331, 334
" recipes.....333, 334
Measurements of famous horses..... 136
Megrims..... 159
Metacarpal bones, inflammation...374, 375
" " recipes..... 375
Measures and weights..... 436
Medicines and doses.....439, 441
Mefke horse..... 47
Mexican mustang..... 68
Mismatched colors..... 155
Movement in trotting..... 99
Moistening grain fed..... 117
Mouth, inflammation..... 310
Moon eyes..... 356
" recipes..... 356
Morgan horse..... 62
" " points of..... 63
Model racing horse..... 147
Moon eyes..... 150
Movement in walking..... 156
Mule, to determine the age..... 35
Mules, value..... 83
" treatment..... 83
" breeding..... 84
" Spanish..... 48
Myositis..... 386

Narragansett pacer..... 63
Native country of the horse..... 18
" Percheron horse..... 38
Nasal gleet..... 239
" causes..... 239
" how to know..... 239
" what to do.....239, 240
" recipes.....239, 240
Nasal polypus..... 240
Naturally weak eyes..... 254
Navicular disease.....379, 381
" " recipes for..... 381
Narrow heel..... 384
Nail picking..... 378
Naval rupture..... 402
Narcotics..... 434
Neurotomy..... 417
Nejdi horse..... 48
Necessity of clean grain..... 117

PAGE.
Necessity of blanketing 119
Norman horse 38
Norman Percheron 57, 58, 59, 60
Norman Percheron, descent of 58
" " points of 60

Oblique tail 51
Ophthalmia 159
" purulent 359
" " recipes for 359
Organs of generation, inflammation of 304
Ossification 158
Ossified cartileges 394
Out shed 109
Over-reaching 152

Pacing gait 100
Pacing 100
Parasites infesting the intestines 289
Parasites infesting the intestines, recipes for 290
Parotid gland, inflammation of 312, 313
" duct, fistula of 313, 315
Paralysis, partial 426, 427
" " recipes 427
Persian horse 54, 37
Performances of Goldsmith Maid 141
Peritoneum, inflammation of 287
Periosteotomy 416
Periosteotomy 414
Picker, the 118
Plow, training for 102
Plowing right hand furrows 102
" square lands 101
" carrying the reins 103
Pleurisy, how to know 256
" what to do 257
" recipes 257, 258
Points of Arabian horse 48, 49
" Norman Percheron 60
" the Morgan horse 63
Ponies 66, 67, 68, 69
" Shetland 67
" Mexican 68
" Indian 68
Poisoning 410, 412
" internal 410, 411
" from stings 412
" " recipes 412
Poisoned skin 413
Poll evil, causes 216
" how to know 216, 217
" what to do 217, 218
" recipes 217
Pond water 113
Preparing food 115

PAGE.
Principles of transmission in horse 72
Projecting teeth 311
Proper stature of farm horse 41
Pulling slowly and steadily 103
Pulling at halter or bridle 149
Pumiced foot 158
Purity, value of in horse 71
Pneumonia, causes 252
" how to know 253
" what to do 254
Purulent Ophthalmia 359
" " recipes 359
Pumice foot 393
Punctured wounds of the sole, inside 395
Punctured wounds 405

Quantity of hay to feed 115
Quarter cracks 152
Quarter false 389
Quittor 158, 389
" recipes 391

Rabies 327, 331
Racking 100
Racer, to train 104
Race riding 104
Racks 107
Racing horse 147
Racer, what he should be 147
Rarey's plan 97
Rat tail 214
" recipe 214
Relaxants 435
Rearing 159
Relative size of sexes 73
Rheumatism 350, 352
" recipes 351, 352
Riding, carriage of the body 98
Riding racers 104
River water 113
Ringbone 149
Ringbone 158
Ring worm 203
" " causes 203
" " how to know it 203
" " what to do 204
" " recipes 204
Ringbone 370, 371
" recipes 371
Rotten bone 375, 376
" recipes 376
Roaring 421, 423
" recipes 423
Roots, feeding 112
Roadsters, highly bred 132
" finely bred 132
Rogue, the 150

PAGE.
Roaring..... 151
Rupture of the colon.....279, 281
" " " stomach 285
Rupture.....401, 402
Rupture of hamstring..... 424
Rupture of bladder..... 303
Running 101
Rubbing cloths..... 119

Saddle galls..... 207
" recipes.....207, 208
Saddle horse, good form for..... 145
Saddle horses of all gaits.....145, 146
Saddle horse, color for..... 154
Saddle horses, styles of action..... 155
Saddle horse..... 135
Saddle and harness horses, training to 91
Saddling and harnessing colts..... 94
Saddle, training to the..... 97
" trotting under..... 98
Sallenders..... 215
" recipes..... 215
Salt in feed..... 115
Sand cracks..... 152
Sand crack 388, 389
" " recipes for..... 389
Scraper..... 119
Scratches, causes.....187, 188
" how to know..... 188
" what to do.....188, 189, 190
" recipes 189, 190
Scoop shovels 120
Scurvy of the teeth..... 308
Scald mouth..... 311
" " recipes..... 312
Scrofula..... 317
Sclerostomum equinum..... 320
Scarlatina 325
Scalds..... 401
Seedy toe..... .....393, 394
Sedatives..... 424
Semi-wild horses of America..... 39
Selection of horse, value..... 73
Shying 159
Shoeing 118
Shying..... 152
Shedding the teeth..... 307
Sharp and projecting teeth..... 311
Shot o'grease..... 324
Shoulder, sweeny..... .....365, 366
" " recipes..... 366
Shetland Ponies..... 67
Sitfast.....207, 208
Side bones.....394, 395
Siam horse..... 37
Single foot..... 108

PAGE.
Skin, acute irritation..... 419
" " " recipes..... 419
Skin, hardening..... 419
" " recipes..... 420
Skeleton of horse, explanation.....23, 24
Slings..... 419
Slavering 310
Sleepy staggers, or apoplexy.....338, 341
Sleepy stagggers, or apoplexy, recipes 340, 341
Slinking foals, to know when..... 80
Smuggler..... 142
Small Hopes..... 143
Soundness and vigor in horses..... 72
Sore nose..... 421
So-so 143
Soundness, warrantee of..... 159
Sour stomach.....272, 273
" " recipes..... 274
Soreness of the anus 283
Sore shins.....374, 375
" " recipes for..... 375
Sore eyelids..... 355
" " recipes for..... 355
Sponges 119
Splint brooms..... 120
Splints 149
Spasmodic action of glottis..... 268
" " " recipes..... 268
Spasmodic colic..... 274
" " recipes..... 275
Spasm of the diaphram..... 285
" " " recipes..... 285
Spavin, bog..... .....344, 345
" blood 344
Spleen, enlargement of..... .....294, 295
Splint.....372, 373
" recipes for..... 373
Spanish barb horse..... 38
Spanish mule..... 84
Spavin, bone.....367, 369
" recipes.....368, 369
Staggers, mad.....331, 334
" blind.....334, 338
" recipes 337
Stifle..... 372
" recipes for..... 372
Strangles..... 271
Stomach, inflammation of.....282, 283
Stomach, rupture of..... 285
" gorged 286
" recipes 286
Strangulation of the intestines.....287, 288
Stump sucking..... 308
Stringhalt 158
Stable tools..... 119

PAGE.
Straw wisps..... 119
Story of thrift and unthrift.....124, 128
Steel gray..... 141
Stumbling..... 149
Stable care..... 117
Stable, water in..... 110
Staling, profuse, or diabetes, causes... 297
" " how to know..... 297
" " what to do..... 297
" " recipes..... 297
Strains and sprains.....396, 397
Stimulants..... 435
Stone in the bladder..... 300
Stricture of the urethra..... 304
Starveling colts..... 82
Stabling colts..... 82
Steady and slow pulling..... 103
Stable, construction..... 104
Stable lott.....109, 107
" walls..... 107
Stalls, width..... 107
" temperature..... 108
Stable, cleaning the..... 108
" surroundings..... 109
" yard..... 110
Surgical and other instruments.....439, 438
Suppression of urine..... 301
Suffolk Punch, horse..... 46
Surfeit, causes..... 198
" how to know..... 198
" what to do..... 199
" recipes.....199, 200
Summer blankets..... 119
Summing up..... 178
Swelled ankles..... 195
" " causes..... 195
" " how to know it..... 195
" " what to do..... 195
Swelled legs, causes..... 195
" " how to know..... 196
" " what to do.....196, 197
" " recipes..... 197
Sweet mash..... 115
Swelled throat..... 260
" " recipes..... 261
Sweeny, hip..... 366
Swellings from pressure..... 421
Symptoms, importance of..... 437

Tartar horse.....37, 55
Teeth of horse..... 32
" " the mark..... 33
Teeth, decay..... 307
" scurvy..... 308
Teeth, projecting..... 311
Teaching a colt to back..... 90

PAGE.
Tetanus.....347, 350
" recipes..... 348
Temperature of stables..... 108
Tendons, division..... 417
Tetter..... 213
" recipe for..... 213
Teething..... 306
" what to do..... 306
Teeth, shedding..... 307
Thrush..... 158
Thickening of the back sinews..... 158
Thrush, causes..... 192
" how to know..... 193
" what to do..... 193
" recipes for..... 194
Thrush..... 312
" recipes..... 312
Thumps..... 316, 317
" recipes..... 317
Thorough pin..... 346
" recipes..... 346
Thoroughbred horse in America..... 61
" " early importation 61
Time to clean..... 118
Toe crack.....392, 383
" recipes..... 392
Tonics..... 435
Tongue, inflammation..... 311
To subdue a vicious horse.....95, 96
Tool room..... 107
To make gruel..... 116
To make hay tea..... 116
Tools of stable..... 119
Top gallant..... 141
To detect vices and defects..... 149
Tracheotomy..... 416
Tumors, black pigment..... 471
Treatment of mares..... 79
Treatment of mules..... 83
Training colts to work..... 89
Tracheotomy..... 414
Training to saddle and harness..... 91
" to harness..... 91
" proper care in..... 93
Training to the saddle..... 97
Training a horse to trot..... 98
Trotting under the saddle..... 98
" movement in..... 99
" in harness..... 99
Training to trot in harness..... 99
" to light harness..... 101
Training for the plow..... 102
" to the wagon..... 103
" a racer..... 104
" track on the farm..... 104
" a stallion..... 104

PAGE.
Trotting in light harness..... 101
" at various speeds..... 102
Trotting horse, to buy..... 139
Trustee..... 411
Trotting, one to one hundred miles, fastest time.....141, 143
Trotter in light harness..... 144
Turning the toe out..... 152
" " in..... 152
Turkestan horse.....38, 54
Turkoman horse.....37, 54
Turkish horse..... 54

Ulceration of the foot.....379, 381
" " " recipes.....379, 381
Unsoundness, what constitutes..... 159
Urine, lime or white..... 300
" suppression of..... 301
" " recipes for...301, 302
Urethra, strieture of..... 304
Using the means we have..... 129

Value of purity in horse..... 71
Value of selection..... 73
Value of mules..... 83
Value of hay and straw..... 106
Value of good shelter..... 125
Vagina, inflammation of..... 305
Veterinary surgery.....414, 418
Vermifuges..... 435
Ventilation of stables.....107, 108
Vestibule to stable..... 108
Vermin.....211, 212
Vermont draft horse..... 46
Vision, dimness of..... 358
Vices and defects..... 149
Vicious horse, to subdue.....95, 96
Vocabulary of horses' teeth..... 36
Walking horse..... 98
Wagon, training to..... 193
Water in stable..... 110
Water in tanks..... 110

PAGE.
Watering.....111, 113
Water before feeding.....113, 114
Watering when driving..... 114
Washing the team..... 118
Washing horses..... 153
Warrantee for unsoundness and vice... 159
Warts..... 209
" causes..... 210
" what to do..... 210
Weak lungs..... 153
Weaving in the stable..... 159
Weed..... 324
Weak eyes..... 354
Weights and measures..... 436
Well water..... 113
Wear of teeth in crib-biters..... 35
What to feed..... 112
What constitutes unsoundness..... 159
What a horse should be..... 157
What constitutes unsoundness..... 158
What to buy for..... 143
When to feed..... 113
Wheelbarrow..... 120
White or lime urine..... 300
White spot..... 151
Wild horses of America..... 55
Width of stalls..... 107
Windmill..... 110
Winter feed for colts..... 112
Wind-galls..... 423
Wolf teeth in horse's mouth..... 33
Womb, inflammation of..... 304
" catarrh of..... 305
Wolf's teeth..... 152
Worms in the eye..... 358
Wounds of the sole..... 395
" " " contused..... 404
" " " " recipes... 405
" " " lacerated..... 405
" " " punctured.....405, 406
Wry tail..... 151

PAGE.

Abortion in cows.....683, 684
" " how to prevent..... 684
" " treatment..... 684
About Barns..... 587
" Dutch cattle..... 518
" Herd Books..... 518
Absorbents, their use..... 707
" recipes for..... 708
Advantages of full feeding..... 619
Afterbirth, retention of..... 680
Alderney cattle..... 492-503
Alderneys, origin of..... 493
" old style, colors of..... 493
" Youatt and Parkinson..... 493
" American..... 494, 495
" characteristic colors of..... 495
" as milkers..... 495
" points of..... 495, 498
" scale of points, cows and heifers..... 496, 498
" bulls, judging of..... 498
" judging by points..... 500, 503
" as dairy cows..... 503
Alfalfa..... 602
American climate *vs.* English..... 508
American Holsteins..... 518
American short-horns..... 468, 469
Anæsthetic, recipe for..... 668
Analyzing the carcass..... 625
Ancient cattle..... 447
Ancient *vs* modern barns..... 597, 598
Angle cattle..... 527
Animals, pulse of..... 672
Animal waste..... 618
Anthrax, preventives of..... 693
Anti-spasmodics..... 703
Arranging basements..... 596
Artificial protection..... 584
Astringents..... 710
Ayrshire cattle..... 504-515
Ayrshires improved, England..... 504, 505
Ayrshires in the East..... 508
" in the West..... 509
" points, description of..... 509
" usefulness of..... 509
" escutchons of..... 510
" from English and American standpoints..... 512, 515
" the body..... 512
" the skin..... 513
" relating to..... 513
" head..... 514

PAGE.

Ayrshires, the top points..... 514
" the teats..... 514
" the color..... 515
" the carriage..... 515
" of Corrick..... 504
" of Kyle..... 504
" of Cunningham..... 504
" of the last century..... 504
" in 1800..... 506
" as milkers..... 506
" English, yields of milk..... 507
" " yields of butter..... 507
" " " cheese..... 507
" " in America..... 508
" first imported to the U. S.... 508
" American, yields of butter.... 509
Baby beef..... 615
Barn, for farm..... 588
" common-sense..... 588
" octagonal..... 588
" square..... 589
" stables in basement..... 590
" cattle feeding basement..... 590
" dairy..... 591
" square cross..... 591, 594
Basements for cattle..... 594, 595
" arrangements, of..... 596
Beef, short-horns for..... 478
Birth, how to manage..... 677
Birth, straining after..... 682
Black quarter..... 685
Blain, recipes for..... 694
Bleeding..... 677
" to stop..... 707
Blistering..... 669
" recipes for..... 669
Blisters, application of..... 700
Bloody murrain..... 692
" " its malignant character 693
Blue grass..... 603
Body of the Devon..... 456
Breed, how to..... 552
Breeds, choice of..... 552
Breeding, general utility..... 553
" in line..... 554
" grades..... 555
" " how to..... 556
" up a herd..... 557
" grades from Texans..... 545
" and feeding cattle..... 551, 570
" grades..... 495
Breitenburg cattle..... 527

PAGE.
Butcher's profit in short horns..... 481
Buttermilk for calves..... 657
Butter, how to sell..... 656
" package..... 656
" temperature to keep..... 656
" receipts, Chicago..... 642
" and cheese, Milwaukee..... 642
" production of..... 643
" coloring..... 650
" salting..... 650
" washing *vs.* working..... 651
" packages..... 651
" " to prepare..... 651
Bulls, scale of points..... 500
Buying to feed..... 623
" breeding cattle..... 623
" milch cows..... 628
" for milk..... 628

Calf, training the..... 572
" haltering..... 572
" unnatural positions of..... 679
" " " " how to obviate..... 679
Calves, castration of..... 569
" early feeding of..... 568
" profits on..... 569
Calving, drinks for cows after..... 709
" paralysis after..... 682
" " recipes for, 682, 683
Carcass of ox, explanation of..... 625
Care of milk..... 646
Castration of calves..... 569
Catarrh, receipes for..... 711
Cat's tail grass..... 603
Cattle, natural history of..... 447
" domestication of..... 447
" ancient..... 447
" teeth of..... 448
" breeds of..... 449
" races of..... 449
" diseases of..... 667, 696
" heavy weights..... 610
" short-horns, weight..... 611, 613
" interests in Texas..... 546
" prime parts in..... 626
" how to buy..... 627
" for feeding..... 623
" special signs of disease in..... 675
" ten years' produce in..... 557
" training and working..... 571, 582
" " *vs.* breaking..... 571
Characteristics of Devon cow..... 452
" " Devons..... 455
" " Spanish cattle..... 542
Cheap stables..... 586

PAGE.
Cheese making..... 652, 656
" production of..... 643
Cheshire cheese, to make..... 655
Chiddar " 653
" " to make..... 654
" " sizes of..... 654
Choice of breeds..... 552
Clysters..... 667
" forms of..... 700
" recipes for..... 700, 701
" stimulating..... 701
" laxative..... 700
" emollient..... 701
" diuretic..... 701
" anodyne..... 701
" for worms..... 702
" astringent..... 702
" nourishing..... 702
Clovers of value..... 602
" undesirable..... 602
Clover rations for cattle..... 565
Coloring butter..... 650
Color of short-horns..... 488
" " the Sussex..... 465
Colors of Alderneys..... 495
Common barn..... 588
Common sense breeding..... 559
" " in disease, value of..... 665
Comparing values..... 565
Comparison of milk products..... 534
Contagious diseases..... 685, 696
Contour of body of short horns..... 483, 484
Corn rations for cattle..... 565
Cough drinks, recipes for..... 708
Coughs, remedy for..... 710
Cows, Devon..... 452
Cow, Hereford..... 459
Cows, gestation of..... 560
Cow, to prevent kicking..... 576
" " sucking..... 578
" " hooking..... 578
" to manage a kicking..... 581
Cows, viciousness in..... 576
" sucking..... 576
Creamery, ex. of..... 645
Dairying, importance of..... 641
" conditions necessary for..... 644
Dairy, the..... 641, 658
" draining for..... 645
" sub-earth ventilation..... 646
" importance of cleanliness..... 647
" animal odor..... 647
" temperature of..... 648
" short horns for..... 477, 478
" cow. The Alderney..... 503

PAGE.

Dairy barn..... 591
" milkers to buy..... 528
Danish cattle..... 522
Description of Ayrshire points..... 509
Devon cattle..... 451
" cows..... 452
" cow, characteristics of..... 452
" working ox..... 454
Devons, characteristics of and important points..... 456
" limbs..... 456
" body of..... 456
" skin of..... 457
" hair of..... 477
" points of.....454, 455
Diarrhea, recipes for..... 710
Digestion..... 636
Diseases of cattle.....661, 696
" in general.....662, 663
" recognizing..... 672
" breathing in..... 673
" temperature in..... 674
" posture in..... 675
" foot and mouth..... 694
" " temperature in 694
" " how to know.. 694
" of the feet..... 703
Dissections..... 697
Distinguishing marks of Sussex cows 465
Diuretic drink..... 709
Doses, forms of..... 666
Dr. Geo. May, on Dutch cattle..... 526
Drink for cows after calving..... 709
Durham bull and cow, old style..... 466
Dutch cattle. (see Holsteins)..... 517
" " true history of..... 519
" " what history says..... 519
" " facts as to..... 524
" " races of..... 526
Dutch Fresian cow..... 526
Dysentery, recipes for..... 710

Earl Spencer's prize ox..... 624
Early feeding of calves..... 568
" maturity, profits in..... 614
Economy of large barns..... 593
English feeding, cost of..... 617
Epidemic diseases.....686, 696
Eruptive " 711
Escutcheon..... 628
Escutcheons of best cows..... 631
" and milk glands..... 623
" marks, value of..... 623
" not always correct..... 634
" in points..... 598
" in Ayrshires.....510, 511
Exercising common sense in breeding 559

PAGE.

Experiments in feeding..... 562
Export butter and cheese..... 643
Eye, cooling wash for..... 704
" in disease..... 672

Facts about Dutch cattle..... 524
Farm barn..... 588
Farmer Thrifty's Cattle..... 584
" Slack's shelter..... 595
Fastenings..... 586
Fat bullocks, outline of..... 625
Feeding qualities, Holland cows..... 531
" stock cattle..... 606
" milch cows..... 607
" for profit..... 508
" cost in England..... 616
" in summer..... 617
" experiments in..... 562
" standard..... 563
" rations for steers..... 564
" stock, to buy..... 625
" cheap corn..... 567
" at milking time..... 575
Firing..... 669
Flooding after calving..... 680
" " " recipes for..... 680
Fomentations, their operations..... 67
" recipes for..... 703
" common..... 703
" anodyne..... 703
" relaxing..... 703
Food vs. product..... 562
Foods, relative value of..... 566
Form as an index to quality..... 555
Foul meadow grass..... 605
Framed sheds..... 585
Frankish cow..... 526
Friesian cattle..... 521
" " characteristics..... 524
Full feeding, advantages of..... 619
Fumigants..... 709
" to make..... 709
Fumigation..... 667

Galloway cattle..... 540
Gelding calves, care in..... 570
General utility in breeding..... 553
Gestation of cows..... 560
" table relative to..... 561
" diseases of.....676, 684
" accidents of.....676, 684
" plural..... 675
" multiple..... 676
" what to do during..... 677
Good care, value of..... 621
" returns, how to get..... 621
" feeding profitable..... 627

PAGE.
Grades, breeding of..... 495
Graduation of doses..... 665
Grasses for stock..... 551
Grease butter..... 641
Guenon's theory..... 628, 635
Hair and condition..... 674
" of the Devons..... 457
Happy family..... 582
Heat of iron..... 679
Heavy weights of cattle..... 610
" " of short-horn cattle 611, 613
Herding, cattle, expense of..... 547
Heredity..... 636
Herefords..... 457
Hereford bull..... 458
" fifty years ago..... 459
" cow..... 459
Herefords in America..... 460
" as milkers..... 460
Hereford ox..... 462
" cow and calf..... 461
" of to-day..... 462
History of Holstein..... 516
" short horns..... 467, 481
Holstein cattle..... 515, 536
" history of..... 516
" cow, escutcheon on..... 632
Holsteins, improvement in..... 576
" for the present century..... 517
" in America..... 517
" first imported..... 517
" colors of..... 517
" herd book..... 519
" regular markets established.. 522
" Dr. Geo. Mayor..... 526
" Mr. Klippart's testimony..... 526
" importation of W. C. Chenery..... 521
" as milkers..... 532
" weights of..... 533
" milk products of..... 533
" herd records..... 534, 535
" cow..... 523
" herd records..... 533
Home dairies..... 647
Horns not certain indications of age... 639
Hoven..... 710
" remedy for..... 710
How to breed..... 553
How to buy and how to sell..... 621, 641
How to shelter..... 583, 600
Improvements in Holsteins..... 517
Indication of pain..... 517
Infectious diseases..... 685, 696
Infusions..... 702
" rule for making..... 702
Injections..... 667

PAGE.
Inversion of womb..... 681

Jersey bull, perfection..... 499
" scale of of points..... 500
Jersey or Alderney cattle..... 492, 503
" cattle (see Alderney)
Jerseys, milk mirrors of..... 630
Judging age by teeth..... 639
Judging Alderney bulls..... 498
Judging Alderneys by points..... 500, 503

Kerry cow..... 536
Kerry's, a rare breed..... 536
" description of..... 537
" hardiness of..... 536
Kicking cow, to manage..... 581
Kind and careful treatment..... 607, 608
Klippart, on Holstein cattle..... 527

Last century, Ayrshires of..... 504
Labor, languid..... 682
Languid labor..... 682
Large presentation..... 678
Limbs of the Devons..... 456
Live weight, estimating..... 622
Long horns..... 450

Make beef young..... 614
Making dairy butter..... 648
Malignant anthrax..... 688
" catarrh..... 695
" " symptoms of..... 695
" " recipes for..... 696
Measurements, estimating by..... 623
Medicines and instruments..... 696, 711
" action of..... 697
" doses..... 697
" when to administer..... 665
" how to give..... 666
Medical recipes for cattle..... 699, 711
Middle horns..... 450
Milking qualities of Alderneys..... 495
Milk mirror in points..... 498
Milking qualities of Holsteins..... 531
Milk products of Holsteins..... 532
" " compared..... 534
" " of Kerry cows..... 538
Milking, training to..... 574
Milking time, feeding at..... 575
" 576
Milch cows..... 607
Milk and beef cow, description of 627, 628
" mirrors..... 628
" " vertical..... 630
" " thigh..... 631
Milkers in all breeds..... 635
Milk veins..... 635

PAGE.
Milk, care of..... 646
" " 649
Model cow, perfection..... 498
" dairy, description of..... 627, 628
" creamery, ground plan of..... 645
Murrain, preventives of..... 693
" recipes for..... 693, 694
Mucilages, use of..... 704

Natural history of Cattle..... 447
" temperature of stock..... 583
" water in food..... 618
Neck of short horns..... 483
Nutritive qualities of Holsteins..... 532
Necessity of shelter.....583, 600
New industries, rushing into..... 610
North Devon cow..... 453
North Holland cattle..... 528

Octagonal barns..... 589
Old style farm yard..... 584
Opodeldoc, to make..... 711
Orchard grass..... 604
Oleomargarine..... 641
Outline of short horn cow..... 465
Oxen training..... 578

Packing butter..... 657
Paralysis, after calving..... 682
Pasture, feed and water.....601, 608
Pasturage..... 601
Pasturing, time for..... 605
Patton..... 469
Pedigree of Comet..... 558
" cow Florissa..... 558
Perfection in cow.....488, 492
Pleuro pneumonia, virus of..... 936
" " period of incubation..... 686
" " " of infection 688
" " disinfection of..... 688
" " contagious.....686, 690
" " history of..... 686
" " malignant qualities 686
" " contagiousness of 686
" " definition of..... 686
Points of cows.....454, 455
Poultices, their use..... 706
" stimulating..... 706
" to promote suppuration..... 707
Polled cattle..... 539
Points of short-horns..... 481
" " " described..... 478
Prolonged labor..... 678
Presentation large..... 678
Prime parts in cattle..... 626
Pre-revolutionary short-horns..... 469

PAGE.
Profits from breeding Texan grades... 545
" on Texan cattle..... 547
" of early maturity..... 673
" of good feeding..... 627
Pulse in disease..... 672
" of animals..... 672
Purity, value of..... 495

Quality, form as an index to..... 555
Quarterale..... 685

Races of Dutch cattle..... 526
Rations for milch cows..... 563
Raising cream, various methods..... 648
" " Dutch method..... 648
" " Holstein method..... 648
" " Devonshire " 648
" " Gussander " 648
Raising calves, experiments in..... 657
" young cattle..... 568
Relative value of different foods..... 566
Red top..... 664
Respiration..... 637
Retention of afterbirth..... 680
" " " recipes for..... 681
Rement for cheese..... 655
Ripe cattle for profit..... 627
Rough shed..... 584
Rowels..... 670
Rule for measuring cattle..... 623

Salting Butter..... 650
Salt for butter..... 652
" impurities in..... 652
Scale of points, short-horn bulls...489, 490
" " " " cows...490, 492
" " " cows and heifers....496, 498
" " " Jersey bull..... 500
Selection in breeding..... 558
" of bulls for Texas..... 548
" " calves for Texas..... 549
Setons..... 670
" recipes for..... 670
Shelter, how to..... 583, 600
" where to plant..... 599
Shallow pans..... 647
Short-horns, cows, scale of points, 490, 492
Short-horns, the back..... 485
" " loin..... 485
" " limb..... 485
" " skin..... 485
" " hair..... 487
" " handling..... 486
" " color..... 488
" perfection in..... 488, 492
" bulls..... 489, 490
" scale of points..... 489, 490

PAGE.

Short horn proper..... 467
" history of.....467, 481
" in America..... 469, 478
" importation 1815..... 469
" " 1817.....469, 470
" " 1820 and 1821... 470
" " 1822 to 1830..... 470
" Ohio importation 1834..... 472
" " 1824 to 1828, 1833 to 1840 472
" " " 1840 to 1850, 473
" " " 1850 to 1851, 474
" " " 1858..... 477
" in the West..... 477
" for beef..... 478, 481
" " dairy..... 477, 478
" points of..... 481
" butcher's profit in..... 481
" the head..... 481, 482
" the neck..... 483
" body, contour of..... 483, 484
" proper shape for fattening, 484
" the crops..... 485
Short horn breeds..... 465, 492
Signs of disease in cattle..... 675
Skim milk, value of..... 658
Skim cheese..... 641
Skeleton of ox, explanation of..... 698
" " and horse compared.... 679
Skin diseases, wash for..... 704
" and condition..... 674
" of the Devons..... 757
Slack shelter..... 595
South Holland cattle..... 528
Spanish cattle..... 542
Spraying..... 667
Splenic fever..... 685
Square barn..... 589
Stimulating tincture.....705, 706
Starting the herd..... 557
Stables in basement..... 590
Stock cattle, feeding..... 606
" feeding..... 6 6
" well and ill kept..... 609
Steaming..... 667
" application..... 667
" nose bag for..... 667
Straining after birth..... 682
Suffolk cattle.....541, 550
Summer feeding..... 617
" shelter..... 598
Sussex cattle, distinguishing marks of 465
" cow..... 465
" the color of..... 465
Swiss cow..... 526
Styptics, valuable..... 706

PAGE.

Table on gestation..... 561
Taints from impurities in milk..... 651
Teeth of cattle..... 448
Teeth, judging age by.....639, 640
Temperature of dairy..... 648
" cheese vat..... 656
Texas cattle 541, 550
" " interests in..... 546
" " acclimating improved bulls in..... 546
" " selection of calves for..... 549
" fever..... 691
" " how to know it..... 691
" " recipes for..... 692
" " what to do..... 692
Texans, feeding in stable..... 543
" improved blood..... 545
Ten years produce in cattle..... 557
The young calf..... 565
The touch, value of..... 626
Thermometrical tests for heat..... 674
Timothy..... 603
Time for pasturing..... 606
Tongue in disease..... 672
Training and working cattle.....571, 582
" vs. breaking..... 571
" the calf..... 572
" to milk..... 574
" oxen..... 578
" stock young..... 580
" cattle, summing up..... 580
True grasses..... 603
True history of Holland cattle..... 519
Twist, veins of..... 637
Twisted suture..... 671

Udder, veins of..... 637, 638
Ulceration of the mouth..... 710
" recipes for..... 710
Unnatural presentation..... 678
" positions of calf..... 678
Urus..... 447
Usefulness of Ayrshires..... 510

Value of purity..... 495
Values, comparison of..... 565
Valuable clovers..... 602
Value of good care..... 621
" milk mirrors..... 629
Vapors..... 667
Veins of twist and udder, infallible marks..... 638
Veterinary surgery, importance of.. ... 662
" pretenders..... 662
Virus, how carried..... 687

Wash for eruption..... 709

	PAGE.
Washes	704
Waste products, utilizing	657
Watering	606
Weights of Holsteins	532
" Texas cattle	545
Weight, to estimate	622
Weighing cattle	626
Well and ill kept stock	609
What history says—Holland cattle	520
What to plant	600
Where to plant shelter	509
Where good beef lies	625
Womb, inversion of	681
" " to prevent	681
Wind-breaks	584
Wounds, sewing	670
" tincture for	710
W. Friesland cattle	528
Yields of milk, Dutch cattle	529
" " " Ayrshires	529
" " " Toudern cows	529
" " " Breitenburg cows	531
" " " Holland cows	531
" " " Holsteins	533
Young calf	568
" stock to train	580
" beef	613

SHEEP.

	PAGE.
Age for breeding sheep	736
American merinos	730
" " origin of	731
Apoplexy	753
Barbary sheep	717
Biflex canal, inflammation of	759
Black-faced Highland sheep	725
Border Leicester	719
Castrating lambs	743
" rams	743
Cheviot sheep	725
Colic	761
Cotswold sheep	720
" " value of	720
" " South	722
" lambs	722
Coupling sheep	736
Diseases of sheep	745, 761
" " head and brain	750
" " urinary organs	757
" " generative organs	757
Division of wool	734
" " " illustration	734
Docking lambs	742
Dorset sheep	727
Dosing sheep	739
Epilepsy	754
Fall pasturing of sheep	739
" feeding of sheep	739
Fine wooled sheep	730
Foot rot	757
" " treatment	758
Fouls in the feet	758
Generative organs, diseases	757
Gravel	758
Grubs in the head	753
" " " " to prevent	753
" extrraction	753
Hampshire Downs	728
Hydrophobia	755
Hydatids on the brain	755
Inflammation of the eyes	752
" " " brain	754
" symptoms	754
Intestinal worms	760
Lambing room	742
Lambs, castration	743
Leicester sheep	724
Lincoln sheep	724
Liver fluke	760
Lockjaw, treatment	754
Long wooled sheep	117
" " " flocking	724
Lung worms	759
" " treatment	759
Maggoty sheep	759
" " recipes	759
Management of lambs	742
Merinos, American	730
" fleeces	730
" the head	731
" the body	732
" characteristics	731, 733
" for profit	732, 733
Middle wooled sheep	725
New Leicester sheep	719
" Oxfordshire sheep	724
Nursery for lambs	744
Oxford Downs	729

PAGE.
Palsy 754
" recipes 754
Parasites on sheep 755
Pasturing sheep 738
Punjaub sheep 717
Rabies 755
Rams at coupling time 737
" as teasers 737
" management 737
" castration 743
Rocky Mountain sheep 716
Roots for sheep 744
Scab 756
" symptoms 756
" to cure 757
" recipes for 756, 757
Sheep, the head 747, 748
" " trunk 748
" " fore-leg 748
" " hind-leg 748
" " important points of 748
" " analysis 748, 749
" " skull of, explained 749
" " importance of head of, 749, 750
" " teeth 750
" " teeth indicating age 751
" " swelled head in 751
" " " " recipes for 751
" " distemper 752

PAGE.
Sheep distemper recipes for 752
Sheep husbandry 715 744
" varieties 715
" importance of 715
" points of, explained 716
Shropshire Downs 728
Sheep breeding 735, 745
" management of 735, 745
" barns 740
" trough 740
Sheep, diseases of 745, 761
Skeleton of sheep, description of 748
Special Winter feeding of sheep 741
Training rams 738
Travel sore 758
The rot in sheep 760, 761
Urinary organs, diseases of 757
Varieties of sheep 715
Vegetable poisoning 752
" " recipes for 752
Watering sheep 739
Weaning sheep 743
White-faced Highland sheep 726
Winter management of sheep 743
Worms, intestinal 760
" lung 759
" liver-fluke 760
" the rot 761

SWINE AND POULTRY

Age of swine, to tell 767
American breed 777, 783
" bred swine 777, 783
Antiquity of the hog 765
Anthrax, malignant 811
Arkansas tooth-pick 798
Berkshires 770
" characteristics of 770, 771
Breeds of American Swine 777, 783
" recapitulation of 782
Breeding and management of swine, 784, 791
" age of swine 786
Care of sows 787
Catarrh in head 813
Charbon 811
Contagious pneumo-enteritis with malignant sore throat 809, 810
Contagious diseases, summary of 816
Contagious pneumo-enteritis with malignant sore throat, recipes for, 809, 810
Calesbill swine 773
Catarrh, malignant, epizootic 105
" " " recipes for 806, 807
Chinese hog 768
China boar 768
" sow 769
Chinese swine and crosses ....
Characteristics of Berkshires 770
" Neapolitan hogs 715
" Essex swine 773
" Poland-China 779
" fixing and holding 785
Chester whites 779, 780
" " west 780

PAGE.
Cheshires..... 791
" improved..... 782
Clean care necessary..... 791
Contagious and malignant diseases..... 805
" pneumonia enteritis...808, 811
" " origin of....808, 809
" " erysipelatous form 809
Cross—barn for swine..... 706
Cumberland swine..... 774
Diarrhea..... 815
" recipe for..... 816
Difficulty in administering..... 804
Diseases of swine.....803, 816
" the skin..... 813
English breeds..... 779
Essex swine..... 772
" origin of..... 772
Farrowing of swine..... 787
Feeding and shelter.....792, 802
" in summer..... 793
" grain..... 794
" south..... 794
" in confinement..... 795
Gestation of swine..... 787
Good vs. food..... 792
Good nursing important..... 804
Grain feeding..... 794
Hog, origin of..... 765, 766
" antiquity of..... 765
" introduction into America..... 766
" " " Florida..... 766
" " " Nova Scotia.... 766
" " " N. Foundland, 766
" " " Canada..... 766
" " " Virginia..... 766
" explanation of skeleton of..... 803
" light *vs* heavy..... 799
Hospital breed..... 784, 797
Hog cholera, intestinal..... 807, 808
" " " causes..... 808
" " " prevention..... 809
Hog barns..... 795, 797
Illustration of skeleton..... 803
Importance of swine..... 767
Improved breeds of swine..... 768
" Berkshire..... 770
" Suffolks..... 774, 775
" Middlesex..... 774, 775
" Cheshire..... 782
Importance of swine..... 784
" " selection..... 786
" " good nursing..... 804
Intestinal hog-cholera..... 807, 808
" " " causes..... 807
" " " prevention..... 809
India hog..... 768

PAGE.
Inflammatory diseases..... 812, 816
Jersey reds..... 781
Jefferson County hogs..... 783
Large Lancashire, white..... 777
Lancashire hogs..... 775, 779
" middle-breed..... 777
Lard worm..... 814
Light *vs* heavy hogs..... 799
" hogs profitable..... 799
Lights, rising of..... 813
Lice..... 815
Magic hogs..... 783
Malignant and contagious diseases..805, 812
" epizootic catarrh..... 805
" " symptoms..... 806
" " recipes for.....806, 807
" authrax..... 811
Mange..... 814
Management of swine..... 789
Markings of Berkshires..... 771
Mast as food..... 794
Medicine, difficulty in administering... 804
Measles..... 813
Middle-bred Yorkshires..... 774
" Lancashire..... 776
Morgan county hogs..... 783
Neapolitan hogs..... 771
" " imported to U. States 775
" hog..... 768
Origin of Essex swine..... 773
" Poland-China..... 779
" Chester White..... 779
Points of Suffolk swine..... 775
Poland-China..... 778
Pneumo-enteritis.....808, 811
" " origin of.....808, 909
" " erysipelatous form... 809
" " vs. authrax, distinction between..... 811
Pneumonia..... 813
Quinsy..... 812
Recapitulation of breeds.....782, 783
Roots for swine..... 793
Rising of the lights..... 813
Scab..... 815
" recipes for..... 815
Selection, importance of..... 783
Short-faced Lancashire.....775, 776
Shelter and feeding.....792, 802
Siamese hog, and Berkshire..... 770
Skeleton of hog..... 803
Small Yorkshires..... 774
Splenic fever in swine..... 811
Strangles..... 812
" recipe for..... 812

PAGE.
Suffolks..... 774
" origin of..... 774
" Prince Alberts..... 775
" points..... 775
Summer feeding..... 782
Summary of necessary care..... 791
" care of swine..... 798
" contagious diseases..... 816
Swine, history, breeds and characteristics..... 765, 816
" age of, to tell..... 767
" breeding in America..... 767
" in Iowa..... 768
" in Ohio..... 768
" in Illinois..... 768
" improved breeds of..... 768
" breeding age of..... 786
" management of..... 789
" cleanliness necessary..... 790
Teeth of the hog..... 766
Trichina Spiralis..... 814
Weaning..... 787
Yorkshire swine..... 773, 774

POULTRY.

PAGE.
African geese..... 891
American wild turkey..... 822
Analysis of wing plumage..... 860, 862
Anatomy of the hen..... 898
Apoplexy..... 898, 899
Asiatic breeds..... 841, 848
Aylesbury ducks..... 880
Bantams, origin of..... 824
" 855, 857
" Seabright..... 855
Barn-yard fowls, varieties of..... 857
Best breeds for market..... 865
Black Dorking..... 829
" Hamburgs..... 832
" East India duck..... 883
" rot..... 900
" " recipe for..... 901
Bolton Gray..... 830
Brahma fowls..... 845, 848
Brida " 849
Brown-breasted red game..... 851
Breeding of poultry..... 858, 865
Breeders, Glossary of terms used 843, 894
" to type..... 864
" grades..... 865
Bronze gray Turkey..... 874
" black " 875
Buff Cochins..... 843
Call ducks..... 881
Canada wild goose..... 891
Care in packing fowls..... 870
Cayuga black ducks..... 882
Chittagong..... 842
Cholera..... 900
Common turkey..... 873
Creve Cœurs..... 840
Crested turkey..... 872
Crop bound..... 901
Croup..... 901
Dark Brahma..... 846
Derby game..... 852
Divisions of domestic poultry..... 826
Disparity in sexes..... 864
Diseases of fowls..... 897, 902
Diphtheria..... 901
Domestic fowls, origin of..... 819, 826
" poultry, how divided..... 826
Dorking fowls..... 828, 830
" white..... 827
" silver gray..... 828
" gray..... 829
" fawn-colored..... 29
Dominique fowls..... 830, 831
Domestic turkey, varieties of..... 872, 873
Dressing fowls..... 868
Duck-wing game..... 853, 854
Ducks, Rouen..... 878, 879
" Aylesbury..... 880
" gray call..... 881
" call..... 881
" white..... 881
" Cayuga black..... 882
" summary of..... 883, 885
Earl Derby game..... 852, 853
Egg-producing fowls..... 868
Egg bound..... 899
Embden, or Bremen geese..... 886
English turkey..... 873
Fawn-colored Dorking..... 829
Fancier's glossary of terms..... 893, 894
Fancy ducks..... 883
Fowls, management of..... 866, 870
" the house..... 867
" proper food for..... 867
" egg producers..... 868
" for market..... 868
" to fatten..... 868
" to kill..... 868
" to dress..... 868
" packing for market..... 869
French fowls..... 837, 840
Frizzled " 848
Game fowls..... 855
" bantams..... 855
Gapes, remedy for..... 900
Geese, sub-varieties of..... 822

PAGE.
Georgia game..... 855
Geese..... 886, 892
" Embden..... 886
" Bremen..... 886
" Toulouse..... 887
" Hong Kong..... 888
" white Chinese..... 890
" African..... 891
" Canada wild..... 891
" management of..... 892
Golden-penciled Hamburg..... 834
Going into business..... 866
Glossary of terms used by fanciers, 893, 894
Gray Dorking..... 828
Gray call ducks..... 881
Guinea fowl, where native..... 822
Gueldar fowls..... 849
Guinea fowl..... 876, 877
" " number of eggs laid..... 876
" " wild..... 876
" " white..... 877
" " spotted..... 877

Hamburg fowls..... 832
Hen, anatomy of..... 898
Honduras turkey..... 874
Hong-Kong geese..... 888
Houdans..... 838

Ideal shape..... 863
Inflammation of egg passage..... 899
" " " recipe for 899

Japanese Bantams..... 856

Killing fowls..... 868

Lafleche fowls..... 839
Large Asiatic breeds..... 841, 848
Laying soft eggs..... 901
Leghorns..... 834
Leg bone of hen..... 898
Lice..... 902
Light Brahma..... 848

Management of fowls..... 866, 870
" geese..... 872
Marketing fowls..... 869
Mating..... 865
Mexican wild turkey..... 820
" turkey..... 875

Ocelated turkey..... 874
Origin of domestic fowls..... 819, 826
Ostrich fowls..... 832

Packing for market..... 869
Partridge Cochin..... 845
Peacock..... 877
PAGE.
Penciled Hamburgs..... 833
Pip..... 901
Plymouth Rock fowls..... 831
Points of poultry, expalantion of..... 801
" the head " ...859, 860
" fowls " ...860, 863
Poultry, history and management 819, 902
" " 819, 826
" wild types..... 822, 826
" the plumage..... 861, 862
" diseases of..... 897, 902

Rheumatism..... 901
Rouen ducks..... 878, 879
Roups..... 899
" recipe for..... 899

Seabright Bantams..... 855
Sexes, disparity in..... 864
Silky fowls..... 843
Silver-gray Dorking..... 828
" penciled Hamburgs..... 833
Sonnerat fowls..... 824
South American fowls..... 825
Spanish fowls..... 836, 837
Spotted Guinea fowl..... 877
Standard white Leghorns..... 837
Summary of ducks..... 883, 885
Sub-varieties of geese..... 822

Tonlouse geese..... 887
Turkeys..... 871, 876
" domestic varieties of..... 872, 873
" time of hatching eggs..... 872
" common..... 873
" crested..... 872
" English..... 873
" bronze gray..... 873
" Honduras..... 874
" Ocelates..... 874
" Mexican..... 875
" bronze..... 875
" " black..... 875

Varieties of domestic turkeys..... 872, 873
" barn-yard fowls..... 827, 857
Water fowl—ducks..... 875, 878
" " —geese..... 886, 892
White Dorking..... 827
" Leghorn..... 834
" Cochins..... 845
" Georgia games..... 854
" guinea fowl..... 877
" ducks..... 881
" China geese..... 890
Wild species of domestic fowl..... 824
" goose..... 891
Wing plumage, analysis of..... 860, 862

APPPENDIX TO INDEX.

PAGE.

Abdallah, Bellfounder blood, record... 954
Acquired qualities transmitted..... 924
Albany Pony..... 952
American trotting horse, development. 951
Ancient British horse..... 905
Ariel, pedigree..... 915
Arab horse, first imported into England..... 906
Artificial care in trotting..... 945
Bandaging the limbs..... 947
Bellfounder and trotting stock..... 953
Bedford, pedigree..... 913
Bedford's get..... 913
Betsy Baker..... 952
Bit, the medium of communication.... 948
Bits and reins, what they are for..... 948
Black Maria, pedigree..... 915
Boston, pedigree..... 915
Boston Blue..... 952
"Brushing" for speed..... 950
Cayuga Chief, early races..... 953
Care in preparing the food..... 946
Choice of blood..... 931
Choice of stallion..... 931
Comparison of speed, English and American horses.....919, 920
Conformation of brood mare..... 927
Cripple, pedigree..... 911
Defects to be avoided.....929, 930
Dicky Pierson, pedigree..... 909
Diomed, pedigree..... 912
Diomed's get..... 912
Dorimant, pedigree..... 912
Driving on the road..... 948
Driving..... 947
" evils of hard pulling..... 947
Dutchman, early races..... 952
Duroc and trotting blood..... 954
Early maturity of horses of to-day..... 920
Early racing horses in Tennessee..... 913
Early racing stock in Kentucky..... 913
Early training useful..... 945
Eclipse, pedigree..... 914
Edwin Forest, early races..... 952
English native stallions in 1730.....908, 909
English vs. American views on speed.. 916
English vs. American race-courses..... 920
Ethan Allen, 1852, record in 1856..... 953
Establishing intelligent action..... 949
Extraordinary performances of horses. 917
Fanny Jenks, early races..... 953
Fanny Murray, 100 mile trot..... 953
Fashion, pedigree..... 916
Fearnaught, " 909

PAGE.

Feeding in training..... 945
Feeding..... 945
First public trot in America..... 952
Fly, Canadian mare..... 953
Flora Temple, in 1853..... 953
Florizel, pedigree..... 912
Foreign stallions in England in 1730... 908
Gabriel, pedigree..... 912
Gabriel's get..... 913
Generous horses vs. laggards..... 945
Giving the horse a mouth..... 948
Goldsmith Maid, memoir of..... 954
" " in 1863..... 955
" " in 1876..... 955
Good roads favor driving..... 948
Great Britain horses introduced into... 905
Hautboy mare..... 909
Hambletonian, pedigree..... 954
" description of..... 954
Hard pullers caused by defect in training..... 947
Herod, pedigree..... 912
Helmsley Turk..... 907
Hitting with the blood..... 931
Hiram Woodruff on driving.....946, 949
Holding the reins..... 950
Horse clothing..... 945
Holding the reins..... 950
Horses introduced into Great Britain 905
Horses first kept for racing..... 906
Horse in King Alfred's time..... 905
" " Athelstan's time..... 906
Horse in William the Conqueror's time 906
Hunting Park Association of Philadelphia..... 952
Importation of Edward III..... 906
" " Henry VII..... 906
" " Henry VIII..... 906
In-bred vs. out-crossed stallions..... 926
Influence of male on embryo..... 924
In-and-in breeding..... 925
Influence of first contact..... 924
Jay Gould..... 956
Keeping one's temper..... 948
King John's importation..... 906
Lady Suffolk, early races..... 953
Lexington, pedigree..... 916
Lecompte " 916
Long Island course..... 952
Makeless, pedigree of..... 910
Marske, pedigree..... 912
Messenger and trotting stock..... 954
Medley, pedigree of..... 911
Miss Colville..... 909

PAGE.
Morton's Traveler, pedigree of..... 910
Morocco Barb..... 907
Modern race horse..... 918
Moses, pedigree..... 913
Monkey, " 909
Noted horses of the last century, South 911
Old time trotters..... 952
Oriental blood in England, time of Cromwell..... 907
Oriental blood and English horses..... 907
Oriental horses no longer profitable... 908
Otho, pedigree..... 912
Out-crossing 925, 926
Ovum of mammalia..... 923
Periodic heat..... 923
Pryor, pedigree..... 916
Principles of breeding.....922, 925
Preparation preceding first trial...945, 946
Queen Mab..... 909
Quantity of food to be given..... 946
Racing horses..... 905
Racing, origin of the word..... 905
Race horses first imported to America 909
Race course first established in England..... 906
Race horses at the North.....914, 916
Race course established at Albany, Poughkeepsie, Harlem, New York. 914
Ripton, early races..... 953
Riding in the saddle..... 951
Rigid pulling a mistake..... 948
Road driving a fine art..... 948
Roadster driving vs. trotting on the course.....949, 950
Routh's Crab, pedigree of..... 909
Roundhead, " "..... 909
Saddle riding in England..... 951
Severe bits objectionable..... 948
Seat of the driver..... 949
PAGE.
Selection of brood mare..... 927
Selina..... 909
Shifting the reach.....950, 951
Shifting the bit..... 950
Shark, pedigree..... 911
Small size of old time racers..... 918
Smart tricks of drivers..... 947
Spark..... 909
Squirt, pedigree..... 912
Steatying the horse..... 948
Stoutness the forte of early racers..... 918
Sweating..... 946
Taking hold of the reins..... 950
Tally Roger, pedigree..... 909
Thorough blood valuable in trotters.. 953
Thoroughbred horses, South.....910, 914
The embryo..... 923
The Giles horse. 952
Time of celebrated horses.....919, 921
Topgallant..... 952
Treadwell mare..... 952
Training to trotting 948
Training, intelligent care necessary... 945
" condition, importance of... 945
Training the 3-year-old..... 948
Trials of speed..... 948
Tryall 909
Trotting horses.....945 957
Trotting horse of America..... 954
Trotting stallions in England, time of Henry VIII., by whom kept..... 907
Turf horses..... 905
Unsoundness to be noted..... 928
Ultimate trotting speed.....949, 950
Value of good bits..... 948
Watering..... 946
White Turk..... 907
Whalebone, early races..... 952
Woodcock, pedigree..... 909

X 826

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